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TANGANYIKA

Annual Report

of the

Department of Agriculture

1958

PART I

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PART I

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TANGANYIKA

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE, 1958

Part I

SECTION I

Introduction

In 1957, a realisation of the increasing expenditure required to maintain expanding social services led the African Members of Legislative Council to submit to the Governor a demand for a plan for increased agricultural productivity. It was hoped that this would eventually raise the territory's financial resources so as to allow it to support the greater social services which are in demand. Thirty-six schemes were selected to form the basis of an application for Colonial Development and Welfare Assistance and work began during 1958 on the twenty-nine of these which are of an agricultural nature.

The extension services of the Department have been further developed and considerable progress has been made towards more and better training both for expatriate and local staff. Greater attention has been paid to modern methods of extension and the community development approach and the use of visual aids has been stressed.

There has been strong reaction in Sukumaland and in some other parts of the territory against Native Authority natural resources rules and regulations and the need for their retention in the changed conditions of the times has been under review.

Substantial progress in establishing the Regional Research Centres was made, and the Northern Regional Research Centre at Tengeru was opened by His Excellency, the Governor, during the year. A detailed report on the research work of the Department will be given in Part II of the Annual Report.

Irrigation demands heavy capital expenditure and very careful planning. Furthermore, it takes time to train staff and farmers to use water effectively and economically. No spectacular advances have been made during 1958 but many valuable lessons have been learnt.

The Land Planning Services of the Department have been reorganized and expanded during the year and two separate regional teams have been established. These services are supported by a separate Survey Unit which does the preliminary mapping and Mechanical Units which carry out various soil conservation works.

In the field of mechanization, Government does not now initiate ploughing schemes but the demand of African growers for tractor ploughing continues unabated. The Department assists individual African tractor owners when it is able but considers that in most areas a greater use of ox-draught would be more economic. The testing of small tools, ox-drawn implements and small processing machines is being carried out at the Machinery Testing Unit at Malya in the Lake Province.

SECTION II

Climate

In November/December, 1957, the rains began well in all areas, but the droughts in January were detrimental to crops in several areas especially where early maize and other grains are grown. Rainfall was exceptionally heavy in February in Dodoma (11·78 inches) and in March in Mahenge (31·78 inches) and elsewhere it was satisfactory. In March and

April, rains were generally good, but they stopped abruptly and there was almost no rain except in a few upland areas until November. This long drought was particularly severe in the coastal districts, resulting in food shortages in Kilwa District which had only half its normal rainfall.

Rains were adequate for the cotton, coffee, wheat, late maize and bean crops and fairly adequate for sisal and cashew.

The long dry season assisted harvesting and marketing, and the quality of marketed produce was generally good, although some produce was spoilt by delay in harvesting. Grazing and valley bottom crops suffered during this long spell.

SECTION III

Main Crops

Figures for the production of individual crops are given in Appendix II. The figures should be read with caution since many crops are either consumed or processed locally and the proportion of crops passing through regular and recorded markets has again fallen during 1958. The reason for this is that the marketing of produce through Native Authority markets is no longer so popular as it was, either with the grower or the buyer. The grower prefers to avoid payment of cesses and duties which are imposed on produce sold through markets and, with increasing competition, the buyer now finds it profitable to give better service to the grower and to collect his produce almost from the doorstep.

Sisal

The sisal industry continues to be the most important single economic factor in Tanganyika.

Export of sisal this year has gone up a little on the previous year, the 1958 figure being 198,130 tons valued at approximately £10 million as against 181,815 tons valued at almost £9½ million in 1957. This has been due to a series of reasonably good seasons, a carry over of stocks from 1957, improved cultural methods and the extended use of fertilisers and lime. Sisal estates are showing increased interest in alternative crops, and both coconuts and cashew nuts have been planted in Tanga Province. Many estates are now keeping cattle both for beef and milk and, in the Eastern Province, several estates have interplanted young sisal with papaw or cotton.

Coffee

The total production of coffee in 1958 was 21,835 tons and the export value of the crop is estimated to have been £7,578,725 an increase of £437,043 over the previous year.

The Department raised over 2½ million seedlings for distribution in both old and new coffee areas.

Mild Coffee

The main feature of the 1957/1958 season in the Northern Province was the earliness of the crop although total production was about the same as in 1956/57, the final figure being 8,475 tons. Increased planting was carried out in the Province and some 510,000 seedlings were issued to African growers during the season. The nurseries in Arusha and Mbulu Districts were run by the Department but those in Moshi are now the responsibility of the Chagga Council. A new process of pre-germinating coffee seed in vermiculite in polythene bags was tried out during the year and found to be successful.

Routine spraying against *Antestia* under the general supervision of the Department continued in both Moshi and Arusha Districts, but in Moshi, Dieldrin was used instead of D.D.T. and executive responsibility was taken over from the Moshi Native Coffee Board by the Kilimanjaro Native Co-operative Union. By the beginning of the long rains in 1959 it is estimated that 4 million trees will have been treated against stem borer (*Anthores*) in Moshi District.

The Kilimanjaro Native Co-operative Union installed a mechanical system for auctioning their crop. The remainder of the African-grown mild coffee crop, in the Northern and other provinces, continues to be sold through the Tanganyika Co-operative Trading Agency while much of the non-native coffee continues to be sold through the Tanganyika Coffee Growers' Association.

In the Southern Highlands Province 1958 was a record year and 2,450 tons of coffee were produced, compared with 1,467 tons in 1957. 370,000 seedlings were distributed in Rungwe and a further 750,000 seedlings were ready for distribution in January 1959. There has also been a noticeable increase in mulching and pruning. In the rest of the Province production increased and further nurseries were established for the production of seedlings.

A Working Party to examine the possibility of setting up a coffee curing works to serve the Southern and Southern Highlands Provinces, and the Northern Province of Nyasaland, met during the year.

In Tanga Province, 370,000 coffee seedlings were distributed and new nurseries for 1959 are expected to produce 520,000 seedlings. The provincial crop, which last year totalled 300 tons exceeded 500 tons in 1958.

The Southern Province production was slightly higher, being 626 tons compared with 500 tons in 1957, and the quality remained excellent. The majority of coffee is produced in the Matengo Highlands but plantings are also taking place in the Ubena Highlands and the Matogoros.

Hard Coffee

In the Lake Province the Bukoba coffee crop, both *Robusta* and *Arabica*, was much the same in quantity as last year but there was a fall in quality.

The Bukoba Native Co-operative Union took over full responsibility for coffee nurseries on July 1st, 1958, employing an ex-Assistant Agricultural Officer to look after this work. One million seedlings were produced and distributed.

In the rest of the Province, the Ngara crop totalled 168 tons and the new coffee areas in North Mara produced their first fruit. A particularly complimentary report was received on the North Mara coffee. Coffee is now also being grown in Geita and Musoma Districts, and growers in Ukerewe and Biharamulo are showing more interest in the crop. Seedling production in these districts totalled over a quarter of a million during 1958.

The berry borer *Stephanoderes hampei* which attacks *Robusta* coffee has been under close investigation by the Department with experimental spraying both on small plots and on whole village areas, but the experiments have not yet been completed. A start was made in Bukoba, Karagwe and Ngara on the treatment of the *Anthores* sp. stem borer using Dieldrin, and *Antestia* spraying was carried out in Ngara and Karagwe.

In the Eastern Province, the Uluguru hard coffee crop totalled 255 tons compared with 400 tons in 1957. In the Mgeta area small quantities of parchment *Arabica* were produced and sold at a premium of 85 cents/kilo over hard coffee.

Interest in *Robusta* coffee continues to increase in Tanga Province and nursery production has been stepped up from 38,000 seedlings in 1958 to over 150,000 in 1959. For the first time, a number of people in the Eastern Usambaras have been persuaded to plant bananas for shade as a preliminary to coffee planting.

Coffee cultivation also commenced in the Wazi Highlands of Central Province where 10,000 seedlings are in nurseries.

Coffee has been grown in Buha, Western Province for some years, but not until 1953 were nurseries established to allow of greatly increased plantings. About 14 tons were marketed through the Kigoma traders.

Increased productivity schemes are under way in several areas of the Western Province and seedlings are being distributed in greater numbers. Growers have taken 186,000 seedlings.

Cotton

The export value of the Tanganyika cotton crop in 1958 was £7,118,404 (including the value of cotton seed and cotton seed oil) which makes it the third most important cash crop in the country.

Lake Province cotton growers again harvested a record cotton crop, but owing to the loss by fire at the Usogore Ginnery of nearly 2,000 bales only 149,764 bales were sold.

It was estimated that 248,546 growers cultivated a total acreage of 400,196 acres. The average area of 1·61 acres per grower was 0·14 acres greater than in the previous season. The yield per acre averaged about 460 lb. of seed cotton which is very much the same as in the 1957 season. These figures are based on a 2 per cent random survey by field staff and too much reliance should not be placed on them.

Quality was generally good. There was some improvement in grading and a much quicker movement from store to ginnery. Packing with pointed sticks, which damages the lint, was reduced to a minimum. The "grey cotton" which results from leaving seed cotton too long in the field or in storage, was again prevalent in Geita in the latter part of the season.

Cotton markets opened on 30th June and continued until early November. A fixed price of 54 cents (Grade A) and 20 cents (Grade B) was promulgated. An early bagging inducement scheme was a great success in speeding up the flow of cotton to ginneries throughout the season and the introduction of weighbridges led to comparatively trouble free primary marketing.

Departmental staff concentrated on encouraging early picking and better grading.

Marketing arrangements for cotton lint and seed were altered in 1958 and all Lake Province lint is now auctioned at the Lint and Seed Marketing Board's Dar es Salaam auctions. Previously, lint was sold by the Board through the agency of the Uganda Lint Marketing Board on the Kampala auctions.

There was relatively little insect damage in 1958, although stainers attacked cotton in marginal areas. A survey was made of *Fusarium* Wilt on cotton in Geita and it was estimated that patches of infection occurred over an area of 4,000–5,000 acres, but no rapid increase is evident.

Approximately 8,000 tons of UK 51 seed had been dusted with the copper fungicide "Perecot" by the end of 1958 for next season's crop.

Growers in the Lyoma area of Bukumbi (Mwanza District) multiplied the UK 55 seed issued in November, 1957. Some 52½ tons of seed, which resulted from this mutiplication, were dusted at Bukumbi with the mercurial fungicide "Abavit B" and sent to Ichamo (Musoma) for further multiplication. Three and a half tons of "Abavit B" treated UK 58 seed are being multiplied in the area of Lyoma in 1959.

In the Eastern Province production increased from 12,500 bales in 1957 to 14,421 bales in 1958. The variety 47/10 was grown in all areas except Chabi in Kilosa District where the new variety Ilonga 58 was multiplied. Sixty tons of seed cotton were obtained from 2,800 lb. of acid treated seed.

Progress in persuading growers to dust their cotton with D.D.T./B.H.C. has been slow although some growers have stated that they wish to buy dust next season.

In the Northern Province rather less seed was taken up in Moshi District and there was a reduction in interest in Arusha. The crop was therefore not as large as in the 1957/58 season, when 2,212 bales were produced. The final production was 1,947 bales. In view of the very poor staple of the BP 52 grown in 1958, arrangements were made for the importation of a small quantity of a new strain of BP 52 from Uganda for the next season. The use of DDT/BHC dust on trial plots resulted in an immediate build up of red spider mite which in Arusha caused almost complete defoliation of one plot.

In Tanga Province cotton had an average year with progress in Handeni, a setback in Lushoto and larger acreages in Pare. Building of a new ginnery at Same commenced during the year.

In the Nzega District of the Western Province the cotton crop has become established and a new ginnery was opened at Manonga in August which ginned 897 bales.

Cashew Nuts

The cashew nut is still the principal export from the Southern Province, and again brought in over half a million pounds sterling to the growers in 1958 despite the unfavourable season. 31,310 tons were exported during the year, this figure includes a carry over from 1957. The 1958 sales through local markets were 18,679 tons but probably 4,000 tons more were produced. The price to the grower averaged 50 cents per kilo throughout the season. The drought in June, July and August resulted in a poor set of what had been very heavy flowering and this, together with damage by *Helopeltis* and *Pseudotheraptus*, had a serious effect on the trees, which in some cases bore no crop at all. Later in the season defoliation occurred to an alarming extent. Investigations suggested that the roots of the defoliated trees have a fungal infection. The quality of the crop offered for sale up to the advent of the rains was excellent, but after the rains commenced the percentage of rejections rose considerably.

Air-layering from certain high yielding trees has been carried out on a small scale and the layers will be sent to the Southern Regional Research Centre at Nachingwea for trial.

In the Eastern Province the acreage under cashew on alienated land has been steadily increasing in the Bagamoyo and Kisarawe Districts, and to a lesser extent in Morogoro and Kilosa, where some planters are planting cashew amongst sisal. As yet, however, few of the plantations are in bearing except on Mafia, where little expansion is possible. *Helopeltis* spp. again caused extensive damage in the coastal areas of the Province.

In the coastal areas of the Tanga Province, Africans are showing considerable enthusiasm in planting cashew trees and several sisal estates have also planted small trial plots.

Cassava and Sweet Potatoes

20,925 tons of cassava passed through markets in the Southern Province during 1958, and it is now established as a valuable cash crop. The price has been good—between Shs. 20 and 25 per 100 kilos—and yields averaged about 1 ton of dry root per acre. The root is milled and sent to Europe for cattle food. There are four mills operating in Mtwara.

In the Eastern Province, cassava is rapidly becoming an important article of commerce, particularly in areas within easy reach of Dar es Salaam, where there is an excellent market at high prices. Production in Handeni and in the Lushoto and Pare hill areas of the Tanga Province has also increased considerably; and the annual export of 4,000 tons of dry root from Kigoma District in the Western Province was again achieved.

The incidence of brown streak and mosaic appears to be on the increase. In Tanga and Pangani, where the variety 46106/27 has been widely distributed there have been signs of a breakdown in mosaic resistance. The disease appears to be worse under dry conditions, but it is now felt that the search for a truly mosaic-free cassava may not be successful. Although five promising ex-Amani varieties are still being tested and bulked, every variety in the past has lost its resistance within a few years.

Sweet potatoes are popular as a food crop and in areas near centres of population are a valuable cash crop also. The good long rains of 1958 favoured extensive plantings, both in valley bottoms and upland areas.

Coconuts, Copra and Coir

Total production of copra in Tanganyika was 10,955 tons in 1958. The Government bonus planting scheme in respect of properly laid out and weed-free coconut plantations came to an end in 1957.

Copra production in Tanga Province was 4,533 tons compared with 3,500 tons in 1957. There continues to be a big sale of fresh nuts over the Kenya border from Tanga District, and prices of Shs. 135 per 1,000 nuts have been obtained. In addition, a small coir extraction plant opened in Tanga early in the year which is taking many green nuts and has produced

over 300 tons of coir. Kiln-dried copra has held fairly consistently its price of about Shs. 3 per frasila of 36 lb. above sun-dried, the respective prices per frasila being Shs. 20 for kiln-dried and Shs. 17 for sun-dried. The history of the small African-built kilns is nevertheless depressing. These kilns were built to a standard design largely of local materials and use coconut husk for fuel. Five of the kilns were burnt down during the year, three fell down and six were unusable and needed re-roofing. Only 21 were working during the year and only two new ones were built.

Both yields and price of copra have been higher in the Eastern Province in 1958 than in 1957. Prices up to 18 cents a nut ex-plantation in Bagamoyo were offered, and the price of copra reached Shs. 20 per frasila for a good quality product.

Copra production in the Southern Province was about 1,000 tons; the cyclone of 1952 destroyed the plantations at Mchinga and little re-planting has taken place.

Maize, Sorghum and Millets

(a) *Maize.*—1958 was a good year for maize in the Northern and Southern Highlands Provinces, with a record production in Mbulu District, but in most other parts of the territory the dry spell in January reduced yields. One of the reasons for the good crop in the Northern Province was a free issue of D.D.T. dust to growers in Mbulu, who used it enthusiastically against maize stalk borer. The incidence of pink ear rot was also extremely low compared with the serious attack of 1957. Non-African farmers at Magara imported "Pioneer Hybrid Maize" seed from the United States, but yields did not appear to be any better than those of the local variety.

In the Southern Highlands Province there was a big increase in maize production in Iringa District, particularly in the Ismani area, together with a doubling of the Njombe District surplus. The total exportable surplus for the Province was 15,282 tons.

Sales of maize in the Eastern Province this year were well below those of 1957. The Rufiji maize crop was almost a complete failure, and in other districts very little of the early maize planted at the end of 1957 matured because of the January drought. The estimated surplus recorded in the Province was 5,990 tons.

In the Central Province, the good rains resulted in a surplus production of approximately 1,400 tons, which is more than twice the 1957 figure.

North Mara in the Lake Province produced 3,430 tons worth about £50,000 in 1958; improved Katumbili maize seed which had been multiplied at Kisangwa Farm was distributed throughout the East Lake Districts.

Over the Territory as a whole it is estimated that surpluses reached 67,000 tons.

(b) *Sorghum.*—This has been a rather poor year for sorghum in many parts of the country. Not only was the rainfall often inadequate, but stalk-borer did considerable damage and in the Mbulu highlands there was an attack by "Asali" disease (*Sphacelia sorghi*). In Mpwapwa, in the Central Province where sorghum is a staple grain crop, the variety known as "Rhodesia" was bulked on communal fields and found a ready market as seed. In general, the yields from the "Rhodesia" variety were noticeably better than those from local seed, and this did not pass unnoticed by local African farmers.

Yields in the Lake Province were generally good. Stalk borer did some damage, but its incidence was less than last year.

(c) *Millets.*—Finger millet is tending to replace bulrush millet to some extent in the higher areas of the Central Province, where it is becoming a cash crop sold for beer making. Millets suffered from the dry weather at the beginning of the year in the same way as maize and sorghum. Finger millet is now the main cash crop in North Mara District in Lake Province and it is estimated that 4,700 tons were produced and exported in 1958. Bulrush millet, which is a particularly popular crop in the area south and east of Lake Victoria, produced an average crop, and growers in all areas had the customary struggle to chase away birds which would destroy the crop if farmers did not take defensive measures.

Oil Seeds

(a) *Castor.*—1958 has been quite a good year for castor and the amount exported totalled 17,858 tons compared with 13,894 tons in 1957. The price dropped from the 1957 average figure of over 70 cents/kilo to between 54 and 65 cents per kilo c.i.f.

The increased acreages which have been planted in Central Province, the main producing area, over recent years possibly coupled with the tendency to ratoon the crop, may have some bearing on the severity of the insect attack by *Helopeltis*, *Callidea* and Shield Bugs. Even so, in Iramba and Mpwapwa cultivators have been tending to plant more castor in place of sunflower because of the very poor price of the latter.

(b) *Groundnuts.*—The production of groundnuts in the Central Province was greater in 1958 than in the previous year—over 3,000 tons being sold through the Native Administration markets alone. The crop withstood the long dry spell better than the grain crops, and yields generally were good. Increased production was obtained in the Wilwana area of Singida, and in the Kilimatinde/Makasuku area of Manyoni. In Dodoma acreage was maintained and good yields resulted in the biggest crop for a number of years—over 1,000 tons.

In the Southern Province the poor rainfall resulted in smaller crops than usual being produced. In Kilwa and Masasi the distribution of "Mwitunde" variety continues. Although the variety is unpopular with the trade owing to its dark red testa, it is rosette resistant and the only known variety to yield well in the groundnut producing areas of the low inland districts of the Province.

Large acreages were again planted in Unyamwezi in the Western Province, and the crop is becoming important in Mpanda. There was a severe outbreak of rosette disease however in various parts of Unyamwezi.

There have been considerable discussions within the trade on the question of grading during 1958. The best prices are obtained for bold samples of light-skinned nuts for the confectionery trade. The variety of nut grown in Dodoma District, while not very light-skinned, is certainly not dark-skinned. It is, furthermore, a good bold nut and has become known in the trade as a definite variety "Dodoma Bold". As such it commands a premium locally over nuts from other areas, except "Bukene", grown in the Western Province, which commands the top price by virtue of its very light-coloured skin.

(c) *Sesame.*—Sesame is an important cash crop in the Southern Province and 6,236 tons were produced. The crop has been increasing steadily each year; in 1953 the production was only 1,286 tons. Very much larger acreages were planted than in the previous year. The price averaged Shs. 1/20 per kilo, and the average yield of the local varieties is between 200 and 300 lb. per acre. Heavy attacks by flea beetle were experienced all over the Province. An interesting development on the Tanganyika Agricultural Corporation development farms was the use of reapers and binders for harvesting the crop. They are said to deal with eight acres per day.

Other parts of the Territory have also had a good year and total production is estimated at 7,048 tons.

(d) *Sunflower.*—The very poor prices now obtainable for sunflower together with the expense involved in long journeys by rail to the ports have discouraged production in almost all parts of the territory and the total crop is down to 8,847 tons compared with 12,650 tons in 1957.

(e) *Mafura Nut* (*Trichilia emetica*).—196 tons of Mafura nuts, which are produced from indigenous trees growing mainly in the Southern Highlands Province, were harvested during 1958. The nuts which are rich in a fatty oil were all purchased by a soap factory in Tukuyu District.

Paddy

1958 was generally a good year for paddy, but the two-peaked flood in Rufiji reduced a potential crop of about 7,000 tons to only 1,200 tons. On the other hand, in the Kilombero Valley of the Eastern Province, floods did little damage with the result that a record crop of 2,708 tons was obtained and in addition nearly 400 tons of hand-hulled rice were sold

on the markets. Prices paid for paddy this year have been abnormally high in many areas. Rufiji "Afaa" fetched from 65–75 cents per kilo. Only in the delta area of Rufiji and in Tukuyu, particularly at Usimbe and Mbwere, is the quality of seed reasonably pure, with the result that most of the rice produced is very mixed.

Between 500 and 600 acres of paddy were planted mechanically by Non-Africans in the Ruvu Valley and small areas in Ulanga and Morogoro Districts. Yields in the Ruvu Valley were reasonably good, but much of the crop was laid by strong winds.

Total sales of paddy in the Lake Province this year were 8,647 tons compared with 5,990 last year. There has been a big increase in production in both Mwanza and Geita Districts, and the price incentive given for "Kahogo" resulted in more interest being shown in this variety in South Sukumaland.

In Mbeya District in the Southern Highlands Province the bulk of the 1,000 tons of paddy produced comes from the Bohora flats where Asian farmers produced the greater part of the crop. On the Nyasa lakeshore in Rungwe District 7,250 tons were marketed this year. Production in the Pawaga irrigated lands in Iringa District was almost double last year's quantity.

In the Mbulu District of the Northern Province the crop was again double that of the previous year.

In spite of poor rain, a greater acreage was planted this season in the Unyamwezi Districts in the Western Province, and some good crops were produced. Most of the dams in Nzega District are now being used for growing rice.

In both the Pare and Lushoto plains areas of Tanga Province an excellent rice crop was grown in 1958. Apart from the crop kept for home consumption, 2,467 tons have been sold on the official markets from these two districts.

In the Southern Province, paddy is definitely on the increase in Kilwa, Newala, Mtwara, Tunduru and Lindi, where it is becoming increasingly popular as a food crop. There is a tendency for rice to take the place of sorghum in the diet. Tractor ploughing is playing its part, and over 3,000 acres have been ploughed ready for the 1959 season. Hill rice virtually failed in all areas of the Southern Province owing to the shortage of the rains.

The Department is continuing its efforts to obtain improved varieties of rice seed and after testing to distribute them in the rice growing areas. The variety "Demerara Creole" has been distributed in the Lake Province, and the variety "Kahogo" selected at Mwabagole Experimental Station is also being planted in many areas. These varieties are not always very popular with the growers, however, as they generally yield rather less than the local varieties, although they have advantages in their early maturity and improved quality. New varieties have been imported from the United States, and efforts have been made to import hill rice seed from India for use in the Mbulu District of the Northern Province.

Total surplus production of paddy in the territory during 1958 is estimated at 29,909 tons which is 2,000 tons more than in 1957.

Pulses

A wide variety of pulses are grown in Tanganyika and they form an important part of the African diet in many parts of the country. Among the types of pulses grown are grams (*Phaseolus species*), various kinds of beans, including haricot beans (*Phaseolus vulgaris*), bonavist beans (*Dolichos lablab*), soya beans (*Glycine max*), chick peas (*Cicer arietinum*), pigeon peas (*Cajanus indicus*), bambarra nuts (*Voandzeia subterranea*) cowpeas (*Vigna sinensis*) and field peas (*Pisum sativum*).

Surpluses to the growers' requirements are sold in the markets and the chick pea crop is almost all sold. It was a poor to average year for pulses in most of the Territory. Cowpeas in the Southern Province suffered badly from flea beetle and many leguminous crops suffered in the January drought. On the other hand good crops of chickpeas were harvested in Kwimba and West Shinyanga Districts of the Lake Province. In the main valley areas of South Geita a reduction of the chickpea crop occurred, but this may well have been because

of a fall in price, many cultivators holding back their crop hoping for a rise in price later. The total crop of chickpea in the Lake Province reached 2,625 tons, about 800 tons more than last year. In the Northern Province, following on the disastrous results with the "Michigan pea bean" (*Phaseolus vulgaris*) in 1957 only a small acreage was sown this year. Results were better, following a rather drier season. There continues to be a big demand in Canada for the haricot bean for canning.

In the Tanga Province there was a fall in the quantity of beans offered for sale in the Western Usambaras, but the Handeni cowpea crop was the highest ever recorded. Cowpea forms an important part of the increased productivity plans for this area, the idea being that cowpea is planted with the short rains in October and is harvested in the New Year, leaving the land ready for timely planting of cotton in February.

In the Western Province, the market figures show a steady decline in production of cowpeas, chickpeas and grams over the years. The Department is trying to revive interest in the planting of chickpea as a second crop after paddy at the dams. In Buha, the yields of pigeon pea were generally good and, in spite of a lower price, market figures rose slightly.

It is difficult to give a precise figure for territorial surplus production of pulses but it is estimated that over 12,000 tons were marketed during the year.

Pyrethrum

The pyrethrum industry is confined mainly to the Northern and Southern Highlands Provinces. Pyrethrum is sold under the aegis of the Pyrethrum Board which also acts in an advisory capacity for measures necessary for the improvement and development of the industry as a whole.

The crop from the Southern Highlands is marketed as dried flowers, but the bulk of the Northern Province crop has been sent to factories in Kenya for processing and has been marketed in the extract form.

Production in 1958 from all sources following a most difficult season amounted to 625 tons of dried flowers compared with 737 tons in 1957.

The year 1958 marked a change in policy towards the production of this crop by African growers in both provinces, and plans have been made for Africans to join non-African farmers in the expansion of the industry by some 500 tons over the next four years.

At present there are some 20–25 acres under African pyrethrum in the Northern Province. In Arusha, some farmers have been picking at the rate of 1,000 lb. of dried flowers per acre. The total provincial crop, however, was slightly less than in 1957, being 376 tons compared with 446 tons in the previous year.

In the Southern Highlands Province it is intended that production by African growers should be expanded to reach 200 tons by 1960/61, provided that the market is able to absorb this quantity. Nurseries are being run by the Department and financed by the Native Authority and seedlings are sold at 40 cents per 100. Fourteen acres of nurseries have been established which should provide sufficient planting material for 250 acres to be planted in January—February 1959. Meanwhile, production by African growers continues to expand along carefully planned and controlled lines. At the present time there are 436 acres owned by 492 growers. This compares with 252 acres and 235 growers in 1957. Yields at Matamba reached 612 lb. per acre in the first year. Every effort is being made to establish a mixed farming economy based on pyrethrum, wheat and peas.

Non-African production of pyrethrum in Uwemba (Njombe), has shown a sharp decline from 197 tons in 1957 to an estimated 145 tons this season. There are now 1,500 acres under pyrethrum, but this figure is likely to drop over the next few seasons. Production has also declined (to 44½ tons) in Iringa District, and this is ascribed largely to the failure of the "Nyahenge" mists, and the sole Non-African grower in Mbeya District has also experienced a drop in yield. Total deliveries of Non-African pyrethrum in Southern Highlands Province were 223 tons compared with 291 tons in 1957.

Unfortunately this insecticidal crop is itself becoming increasingly the target for insect pests. The most serious pests of pyrethrum in the Northern Province are thrips, red spider mite and two root-eating grubs. A leaf disease (*Colletotrichum* sp.) never before recorded in pyrethrum was found on plants at Nanjara in Moshi. In the Southern Highlands Province thrips are becoming a serious threat to the industry. The Entomologist at the Northern Regional Research Centre is working on these problems.

Seed Beans and Seed Peas

In the Northern Province, 1958 was one of the rare ideal years for seed production. Some excellent yields, as high as 8 bags seed beans per acre, have been obtained from widely scattered areas, and quality has also been high. Production reached 3,420 tons compared with 1,247 tons in 1957. A severe outbreak of bollworm threatened the crop in the farms below the Rift Wall, but prompt action by the farmers enabled effective control to be done by air spraying at an all-in cost of about Shs. 30 per acre. The only exception to the generally good results this year was at Magara, where the crop was again a failure. There were a few reports of the condition known as "oily pod" this season. This is a condition the causes of which are not yet understood, in which the young green bean has an "oily" feeling.

A feature of the industry which continues to worry the Department and many of the seed growers is the large importation of seed for bulking and the danger of introducing some disease which does not so far occur in the Territory. The matter was debated at the meeting of the Seeds Board in November, but it was decided that it was not practicable to impose restriction in view of the large consignments of new seed coming into the Territory.

African farmers are taking a greater part in this industry; several of the farmers at Likamba in Arusha and Karatu in Mbulu Districts were sub-contractors for seed growers this year.

Production of seed peas in the West Kilimanjaro area of the Northern Province continues. The seed pea industry in the Kibenga/Mufindi area of Iringa District produced 150 tons in 1958, and Njombe and Mbeya Districts produced a further 80 tons. The growers are obtaining a good price for their crops.

Sugar

The Tanganyika Planting Company now have 7,000 acres under cane at Arusha Chini near Moshi. Northern Province production for 1958 was 21,133 tons, a further substantial increase over previous years. A second company has now started sugar cultivation on two adjacent estates in Arusha District on one of which about 400 acres are already under cane. For many years the Tanganyika Planting Company has been troubled by the cane chafer, and they have now arranged to import a Scoliid Wasp from Hawaii in an attempt to control the pest biologically.

New sugar varieties imported into East Africa undergo two years of quarantine. In the first year the varieties are planted under glass at Muguga in Kenya, but are first given heat treatments to ensure that they do not carry any ratoon stunting disease or insect pest which could endanger the local industry. The second year of the quarantine is spent at Kawanda in Uganda under observation where the setts are planted in the open. The bulking up of setts in Tanganyika takes place on the Morogoro Experimental Station and 15 varieties of cane ex-Kawanda made excellent growth there during the year. At harvesting time these were sent to the Tanganyika Planting Company at Moshi. A further 17 new varieties were planted at Morogoro during the year.

Production of jaggery in the Eastern Province remains at about 1,500 tons, most of which is sold to sisal estates in Kilosa District.

The new Sugar Estate in Bukoba, Lake Province, which now has some 2,000 acres of cane under cultivation began producing white sugar at the end of the year.

An Estate at the foot of the Eastern Usambaras in the Tanga Province has 300 acres of sugar cane, from which they produce an extract which is sold to sisal estates for local beer.

Tea

The tea industry continues to increase its production and new development is taking place in the Usambara Mountain area of Tanga Province and in the Southern Highlands Province.

In Tanga Province the increase of acreage is going ahead rapidly, and practically every estate with land available is planting new areas. The acreage in the Province has now reached 6,000—nearly half the territorial total. Three new factories have been opened—at Dindira in the Western Usambaras a small factory, at Derema in the Eastern Usambaras a large standard type factory, and at Kwamkoro in the Eastern Usambaras a large factory using new Legge cutting machinery. A further three new factories are under construction at Ambangulu and Herkulu in the Western Usambaras and at Bulwa in the Eastern Usambaras. Production in 1958 totalled 2,205,929 lb. compared with 2,132,177 lb. in 1957, but many new areas are not yet in production on a large scale.

In the Southern Highlands Province the total crop was higher than in 1957, 4,122,245 lb. compared with 3,993,407 lb. but on the other hand yields per acre were below those of last year due to the abnormal season. Development of new tea land in Mufindi, Tukuyu and Njombe has gone ahead rapidly.

The total production in the territory as a whole was 6,328,174 lb. compared with 6,125,584 lb. in 1957.

Tobacco

Flue-cured.—The production of flue-cured tobacco comes mostly from farms in the Southern Highlands Province, but the industry is growing steadily in the Western Province where African and European growers are participating in schemes under the direction of the Tanganyika Agricultural Corporation and the East African Tobacco Company.

The Southern Highlands Non-Native Tobacco Board regulates the growing and marketing of the crop in the Southern Highlands Province and finances a research station near Iringa, which is under the guidance of the Agricultural Department.

The tobacco farmers in Iringa District had a very successful year in 1956. The weather generally was suitable for the cultivation of the crop, though there was some hail damage rather late in the growing season. The production of leaf in 1958 totalled 2,506,927 lb. Virginia and 202,499 lb. Ehlers. The total value of the crop was approximately £433,000 compared with just over £400,000 in 1957. All the tobacco was sold through the Southern Highlands Tobacco Union in Iringa.

An area of 13 square miles at Lupa Tingatinga in the Chunya District was taken over by the Agricultural Department. Early trials had been successful and the Tanganyika Agricultural Corporation became management agents for the development of an African Tenant Farming Scheme. In early 1958 there was a long dry spell during the planting season, with a serious attack of *Anthracnose* in the seed beds. However, from the 45 acres of Virginia tobacco planted, some 37,500 lb. of leaf were produced, giving an average of over 800 lb. per acre, despite some White Mould (*Erysiphe cichoracearum*) on the late planted crop and fairly general eel-worm infestation.

In Urambo in the Western Province, where the production is largely in the hands of Non-African farmers, 1958 was not a good year as the rainfall was erratic, and *Anthracnose* destroyed a number of seed beds. Bud worm was serious, and grasshoppers did much damage in the early planted fields. Many growers have adopted the practice of dry planting, some as long as three weeks before the rain is expected to fall. At Tumbi where the East African Tobacco Company has a Leaf Centre and an Experimental Farm, the acreage is increasing and so is the yield and quality of the leaf. In an attempt to introduce the complete operation of tobacco growing to the cultivator, one person was encouraged to cure his own leaf in a small mud and wattle barn. Developing on this success, the management at Tumbi in the new season have persuaded eight people at Issenge to build similar barns in which to cure the leaf from one or possibly two acres.

The total production of flue-cured tobacco in the territory was 3,693,760 lb. which is almost the same as in 1957.

Fire-cured.—There are two main areas of production; in the districts south-west of Lake Victoria and in the Songea District of the Southern Province.

The Nyamirembe Native Tobacco Board purchases from growers in Kibondo, Biharamulo and Ngara and then sells the crop to the East African Tobacco Company in Kampala. The tobacco leaf is now sent by road loosely packed in hessian, direct from the markets, instead of bulking at the Nyarambungu factory and shipping across Lake Victoria. This reduces the damage by handling and the danger of infestation by *Lasioderma* beetle. The transport arrangement worked satisfactorily except for one breakdown. There was increased planting in 1958, seed beds were relatively free from disease, the early planted crop did well, but the general weather conditions were not favourable for a bumper harvest. Some of the best and longest leaf was again taken as coil to Ruanda-Urundi. Production is falling in Biharamulo and Ngara, but is on the increase in Kibondo, and the total crop sold to the Board was 387,004 lb. of leaf, worth £17,318.

There has been a revival in the fire-cured tobacco industry in Songea as a result of a combined campaign by the Agricultural and Co-operative Development Departments and the Ngoni-Matengo Native Co-operative Union which now markets the crop in place of the Songea Tobacco Board. In 1957 growers produced 598,000 lb. of leaf, the lowest figure since 1950, but in 1958, 1,272,320 lb. passed through the factory and had not the rains at transplanting time failed, the figure would have been higher. Last season the Union subsidised payments to the extent of Shs. 76,000, but this year subsidisation has been unnecessary owing to the general improvement of quality of leaf and moral of the growers. Three hundred and eight kilos of seed were produced on the Union's seed farm, more than half of which was sold to the District Societies.

Total production of fire-cured tobacco in the Territory was 1,431,592 lb. which is about 400,000 lb. more than in 1957.

General.—Tobacco is produced in small quantities for snuff and coil and is a very useful minor cash crop in many districts.

The Agricultural Department is investigating Turkish tobacco as a possible cash crop for the areas drier and lower than those suitable for flue-cured tobacco. It has several advantage in that it is sun dried, is profitable even in small acreages and there is a good demand for the crop.

In contrast with most of the cash crops, the price of tobacco has been well maintained and production is steadily increasing, both of flue and fire-cured.

Wattle

The Tanganyika Wattle Estates of the Colonial Development Corporation at Njombe completed their planting programme of 33,000 acres in 1956. The tannin extract factory has since been opened.

The associated Ubena Wattle Scheme, which enables African growers to produce bark for the factory, continues to expand. The acreage of the Scheme reached by the end of 1958 was 7,042.

The Tanga Province production of bark in 1958 was 1,417 tons. It is now estimated that there are 15,000 acres of wattle planted in the western Usambaras, and 1,500 in the Pares. An extraction plant exists at Lushoto to process the bark produced in that area.

In the Moshi District of Northern Province some 167 tons of wattle bark were produced in 1958. This was all sold to the Moshi Trading Company for their tannery at Himo.

Wheat

In common with other grain growers in the Northern Province, the wheat growers have enjoyed a very satisfactory year in 1958. On Kilimanjaro, not only was the short rains crop a success, with some 3,000 tons of grain being sold, but the long rains crop was also one of the best for many years. Over 3,100 tons of Grade I wheat were produced in the Province by non-African farmers. The success of the crop can be attributed to the ideal rainfall, very little black stem rust, and the almost complete absence of attack from Sudan Dioch. Some damage was done by birds to the short rains crop, but immediate action by aerial spray kept the invasion in check. African farmers are taking a greater interest in

this crop, and growers in the Likamba area produced 146 tons of wheat in 1958. At one time three combines could be seen at work in African fields. Another feature of production this season was the contract spraying of much of the wheat with Shell D4 for weed control. White Mould was recorded on wheat in the Oldeani area for the first time this season, but damage was negligible.

The Southern Province crop which is grown in the Matengo Highlands totalled 347 tons in 1958, which is an increase of 47 tons on the previous year.

Planting was on a larger scale than usual on non-African estates in Mbozi in Southern Highlands Province, but the failure of the rains, together with the late planting, resulted in a very poor crop of only some 50 tons.

Small quantities of wheat are grown in other areas of the territory such as in the Ngurus, Mahenge, and in Ufipa and Karagwe Districts.

The surplus production in the territory was 6,561 tons in 1958, which is considerably higher than the crop produced in any of the last three years.

SECTION IV

Minor Crops

(a) *General.*—Among the many minor crops of local importance are certain essential oils, *Derris*, rubber, raffia, *Allanblackia* nuts, dates, gum arabic and gum copal. In Tanga Province the Sigi Segoma Estate produced 7,411 lb. of bitter orange oil in 1958, and in the Morogoro District of Eastern Province 69 tons of *Allanblackia* nuts were sold. Gum arabic is collected mainly in the Central and Western Provinces, and gum copal occurs in the coastal districts and on Mafia island; 503 tons and 13 tons respectively of these crops were exported.

Amongst the spices, a good crop of black pepper totalling 2,450 lb. was harvested in Tanga Province compared with 1,500 lb. in 1957. The price remained at Shs. 4 per lb. Bulwa Estate, near Amani has planted 10 acres of Cardamon, and Africans have also been supplied with planting material by the Department. Selling prices in 1958 varied between Shs. 12 and Shs. 20 per kilo. Clove seedlings are being planted out by a few Africans in Tanga and Eastern Provinces, and the green ginger crop in Morogoro totalled 5 tons.

(b) *Barley.*—This crop is of major importance to the farmers of West Kilimanjaro where both excellent malting samples and high yields of feed barleys are obtained. Yields in most areas were fairly good. The second prize in the Kenya Brewers Barley competition went to Mr. Webb of Ol Molog this year.

(c) *Betel Nuts.*—The Betel nut industry in the Tanga Province which is confined largely to the Pangani River area, is increasing. Production in 1958 was 119 tons, which is the highest ever recorded. A limited number of seedlings have been made available from the Department's nursery at Sigi, and some have been planted in the Muheza area.

(d) *Chillies.*—This crop has been very popular with farmers opening up new farms below the Rift Wall in the Northern Province and on many estates in other parts of the country, as it brings in ready cash fairly quickly. Quite large acreages have been grown and at times the market has had some difficulty in absorbing production.

(e) *Cocoa.*—Interest in this crop continues to increase in a satisfactory way, though the limited area which is suitable from the climatic point of view will never allow expansion to reach very large proportions. The owners of Maramba Estate in Tanga have continued to plant up as fast as they can, and at Sigi Segoma Estate, old cocoa land is being cleared and planted. The Department has laid down a programme of trial plots in Handeni and Tanga Districts and in the Vugiri area of Lushoto, and nurseries are being expanded to meet the African demand for seedlings.

In the Rungwe District of the Southern Highlands Province a number of cocoa trees were established at the Native Authority Njugilo Investigational Unit in 1952, but few now remain due to lack of shade. Attempts have been made however to establish a suitable microclimate around the remaining trees by mulching and these measures have succeeded.

(f) *European Potatoes.*—Production of potatoes in 1958 in the Northern, Tanga and Southern Highlands Provinces was much the same as in 1957. The blight resistant strain 1521(c)3 continues to be distributed in Tanga Province and the variety Dutch Robjyn in some other areas. In Tanga Province, leaf roll and bacterial wilt were much in evidence and for this reason it was decided to discontinue exports of 1521(c)3 for seed to other parts of the Territory.

(g) *Fruit.*—In Pangani District, banana production for export to Mombasa continues and there has been increasing trade in bananas from the Ulugurus to destinations on the Central Line, from Bukoba to other parts of the Lake Province and from the Usambaras to the sisal estates in the plains. Panama Disease of bananas has been much in evidence in the Tanga Province, and this has been the worst year for it for some time. The Luwengera Valley, parts of Pare and the plains areas around Korogwe had several outbreaks, and a good deal of time had to be spent by staff in killing and destroying diseased plants. By the end of the year the outbreaks had all been dealt with, and no further trouble was reported.

Messrs. L. Rose and Co. Ltd., the well known lime juice manufacturers, made a survey of all lime-growing areas in East Africa during 1957. It was found that the limes of the Southern Province of Tanganyika, and especially those south of Mikindani, had the correct flavour for converting into lime juice. Messrs. Rose and Co. established a base in the area where they hope to construct a factory to deal with 250 acres in the first instance. The Agricultural Department put in a nursery of 12,000 seedlings in June and other nurseries were also planted.

The orange crop in Tanga had a thoroughly bad year, and production was only 725 tons, the lowest since 1951 and a big drop from the 1,728 tons produced in 1957. The drop in production was due to the poor rains, and to a sooty mould which took heavy toll of flowers and leaves. Prices were good, being up to Shs. 90 per 1,000. Similar misfortune has attended the local pineapple industry which now offers poor prospects. The 1957 production of 58 tons has dropped to a mere 25 tons in 1958.

The Morogoro Nursery has been in full production during the year, and work has followed along the usual lines of rooting, budding and grafting. During 1958 over 5,000 citrus plants and over 3,300 ornamental plants were sold.

The sale of seedling trees of plums, apples and pears in the western Usambaras is slowing down. This is due to the supply exceeding the demand. Marketing is not easy because of the large distances which fresh fruit has to be carried.

(h) *Kapok.*—Prices have fallen even lower than last year and as little as 30 cents per kilo (unginned) was all that could be obtained by growers towards the end of the season. Much of the crop therefore remained unharvested in 1958.

(i) *Kenaf fibre.*—Trials have been made with this crop in the Northern Province for the past two or three years. There is little doubt that the plant grows very well in many of the lower areas of the Province, but yields of fibre have not yet reached 1,000 lb. per acre in small scale trials. Reports on fibre produced on this small scale have been variable, and this year's fibre from Karangai was not quite up to that of 1957, when the sample was considered one of the best seen from East Africa.

(j) *Onions.*—1958 was a very good year for onions in Mbulu District and there was an increased acreage planted in Moshi. Poor germination of seed was said to be the cause of a reduced acreage in Arusha. Onion production is also important in many other parts of the territory and increased production from Lindi, the Western Usambaras, Unyamwezi, and Iramba is reported. In the latter district, a record crop estimated at 900 tons was produced, though only about 200 tons passed through the markets. Onions thrips caused damage to the crop in Tanga, and in Manyoni District in the Central Province.

(k) *Palm Oil and Palm Kernels.*—This industry is centred in the Western Province but little progress is being made. Many trees are being felled for wine-making, and only limited new plantings are taking place. Oil Palm seed has, however, been made available and some palms have been planted at Ilagala, Sumbawanga and Mpanda. In the Southern Province seedlings are distributed from the Mahiwa Farm.

Production at the Magoroto Estate in the Eastern Usambaras in 1958 was 82,880 lb. of oil and 24,640 lb. of kernel, which is a considerable increase on 1957.

(l) *Papain.*—There has been a fall in price of this commodity during the year, from Shs. 32 to Shs. 20 per lb. The production of papain continues to form an important part of the economy of the farms below the Rift Wall, and in the lower areas of Arusha, and production has been considerably greater this season than last.

A great deal of thought has been given to improvement in production techniques, especially in the design and operation of driers, and there have been useful improvements in these directions. An efficient forced hot air system is now being used to reduce the time of drying, while still keeping the correct temperature.

Pythium and *Corticum solani* fungi continued to cause severe losses in papaw nurseries in the Magara and Kiru areas. Normal methods of preventing "damping-off" failed to control the attack. Eventually pre-germination of the seed with vermiculite in polythene bags was resorted to, and several nurseries of disease free seedlings were raised.

(m) *Vegetables.*—In the two main producing areas, the Ulugurus and the Usambaras, the principal problems continue to be over production at certain times of the year and lack of an efficient marketing system. On the other hand, there is a decided trend towards more planting in other areas of the territory so that most town populations are now able to obtain good supplies for most of the year. Even in Bukoba District, where vegetables have always been difficult to obtain, African farmers are now competing with each other to supply the township market.

SECTION V

Increased Productivity Schemes

In 1957 140 different Increased Productivity Schemes were submitted by District Teams throughout the Territory and, following critical examination by the Natural Resources Sub-Committee of the Territorial Advisory Development Committee of Legislative Council, a number of these were implemented immediately, using existing staff and finance, and a further 36 schemes were selected to form the basis of an application for Colonial Development and Welfare assistance. Of these, 29 were primarily agricultural development schemes, of which 13 are concerned with increased coffee production, 2 with increased pyrethrum production and 5 aim at an increase in a number of different crops. Other schemes are intended to assist with mechanization in Rufiji, the use of fertilisers in Morogoro, potato production in Lushoto and ox training in the Central Province.

In most cases funds provided under these schemes are being used to employ additional staff and to provide housing for them, and work began during 1958. Coffee nurseries have been established in all the coffee production schemes, the maintenance costs of which will be provided by Native Authorities once the nurseries have become established. An example of a coffee scheme which is showing good progress is in Rungwe. Production is already increasing very satisfactorily and 58 nurseries were sown early in 1958. These are expected to produce 750,000 seedlings for distribution in 1959. This particular Scheme provides for one field officer and 10 junior field staff, who are being trained intensively in coffee management. The new staff have been well received by the cultivator, and if the present spirit of co-operation continues, this welcome addition to departmental staff should achieve excellent results. All coffee schemes are making good progress with the exception of *Robusta* development in the foothills of the Eastern Usambaras.

Of the two schemes based on pyrethrum, one is in Njombe and the other is in Arusha. In Njombe it is now intended that production should reach 200 tons by 1960/61, provided the market is able to absorb this quantity. Seven African Growers' Associations have been established, each holding a single Pyrethrum Growers' Licence, under which all its members sell their crop. Progress has been excellent, and the industry has been established on a sound footing. Fourteen acres of nursery are supervised by the Department and financed by the Native Authority, and these should provide sufficient planting material for

250 acres to be planted early in 1959. Progress has been held up in Arusha District by difficulty in finding land for nursery areas, and by delay in the construction of a water pipeline. The area has a great water shortage, and no large scale development can be hoped for until the water problem is solved but it is hoped that a target of 50 tons of pyrethrum by 1962 might be achieved.

The former Rufiji Ploughing Scheme, which undertook contract ploughing in paddy areas from 1949—1955 has created a demand for ploughing in the district. In 1956 numerous groups of cultivators banded together to buy their own tractors, with the intention of doing their own ploughing. They were, however, seriously handicapped by lack of knowledge and experience, by difficulties with servicing and maintenance, and by insufficient knowledge of cost accounting, and some peculation. It was therefore decided to provide a mobile workshop, and this, staffed by a field officer and an assistant, started operations during 1958. The workshop is mounted on a Ferguson trailer and drawn by a tractor, and a charge of Shs. 15 an hour is being made.

In the Usambaras, now that a blight-resistant variety of potato suitable for local conditions has been found, the main limiting factor to increasing potato production appears to be a deficiency of seed in a suitable condition for planting at the time when it should be planted. This is due to the fact that only one crop per annum can be grown on rain alone in the Usambaras, and it is extremely difficult for growers to keep supplies from one year to the next. A scheme was therefore introduced to allow for the growing, storing and distribution of seed potatoes of the blight-resistant variety 1521(c)3. A plot was obtained at Mgwashi and the project has gone ahead according to plan. An adequate store for keeping the seed potatoes has been provided.

The Central Province contains large numbers of cattle, yet their use as working animals is very restricted. Production could be stepped up considerably if the use of ox power and ox drawn equipment became general. Ox ploughing by itself is only part of the answer. The bottleneck in the management of larger acreages is weeding, and the introduction of ox cultivators is required and also ox carts for the carting of manure to the field, crop residues from the field, and produce to market. A scheme was therefore commenced in 1958 whereby 20 sets of equipment, each consisting of ox cart, ox plough, ox cultivator and ox ridger, have been distributed over the six districts of the Central Province and training of oxen has taken place in all areas.

A number of schemes are based on the production of a selection of different crops. In Handeni District, extra staff have been taken on, and the aim is to increase production of cotton, cashew and cowpeas in certain focal point areas. Good results have already been obtained by this concentration of staff. Cotton production rose sharply from 207 tons in 1957 to 350 tons in 1958, and far more seed has been taken than usual for planting in 1959. The intention of the scheme is that cowpea shall be planted in the short rains and cotton then planted on the same land in February. This idea was well received by cultivators, and early in the year the first cowpea crop, totalling 135 tons, was produced. The planting of cashew, however, went only moderately well but another aspect of the scheme, the digging of wells, has begun. In the Nguu mountain range of Handeni, a scheme aimed at increasing *Robusta* coffee in the hills and increasing castor and cotton production around the base of the hills was commenced. New staff were appointed and 22,500 *Robusta* coffee seedlings were planted in March. The Land Planning Service of the Department assisted in the laying out of road alignments, and new roads will be constructed in 1959.

A scheme in Tanga District aimed at increased production of *Robusta* coffee, citrus, cardamon, cloves, ginger and black pepper, was begun in 1958. New staff have been appointed, and considerable interest has developed in a limited production of cocoa by Africans. Five coffee nurseries were established, and a small nursery for the various spices was planted.

A scheme which envisages mixed farming and development in the Irangi expansion area began in 1958. The Warangi are essentially cattle people and dislike moving out of the hill country on to the plains. Settlement has been concentrated along the foot of the scarp, but the deterioration of the soils is likely to follow the pattern in the highlands if a wider

dispersal of people and stock is not achieved. This scheme proposes to improve grazing conditions on the plains by introducing a system of controlled grazing so that a larger number of cattle may be carried. At the same time a greater production of groundnuts will be encouraged and finally trial plantings of cotton will be carried out. Additional staff have already been employed and a tractor, a grass cutter and plough have been purchased for the making of firebreaks to protect the Mbuga grasslands. A beginning has also been made on another scheme which is intended to expand arable production into an old cleared tsetse belt in the Kilimatinde-Makasuku area of Manyoni District. It is hoped to increase the production of groundnuts and castor in the area.

There are two schemes based on increased production of fish. There are in the Central and Eastern Provinces a number of fisheries on small lakes, rivers, swamps and dams, which are of considerable economic importance. Great increases in productivity can be expected from these with the introduction of new or improved methods of fishing and preservation and marketing of the product. New fish resources are being provided by the stocking of many of the permanent dams and hafirs. Good progress has been made with the first phase of the scheme in the Central and Northern Provinces.

The second scheme, which will begin in 1959, is concerned with the development of the valuable "dagaa"* fishing industry of Lake Tanganyika.

SECTION VI

Vermin and General Pests

The enforcement of the 1957 Plant Protection (Compulsory Fumigation of Imports) Order which is aimed at preventing the introduction of the Khapra beetle (*Trogoderma granarium*) into Tanganyika, involved headquarters officers in a great deal of work at the beginning of the year, so a field officer was posted as a produce inspector to the Dar es Salaam Port area from mid-September 1958 to deal with the problem. Since he arrived he has made fifteen ship inspections and found *Trogoderma* to be present in ten of them.

The Produce Inspector also inspects used bags and has to examine every entry in the customs records of goods suspected to be harbouring insect pests and diseases.

In the Lake Province the South East Lake County Council Vermin Control Units killed many thousands of porcupine during the year—a conservative estimate is 36,000. The Units also destroyed monkeys, baboon and pig in greater numbers than before and this has proved to be a popular service. A successful baboon poisoning campaign was carried out in Mpwapwa District of the Central Province under the guidance of the Department. In the Eastern Province the rather poor food crops this year have resulted in the picking of cotton being done more expeditiously than usual, with a corresponding reduction in rat damage. Baboon hunts were organised at Ulaya and Kidodi and at Kidete Station in Kilosa District. In Handeni, the Native Authority have employed nine poisoners who have accounted for 423 pigs, 4,176 baboon and 3,495 monkeys.

Elephants have done considerable damage in Tunduru and Kilwa in the Southern Province, and there is now a Game Department elephant control team at work in the latter District.

The Prickly Pear Scale Insect (*Dactylopius tomentosus*), has bred rapidly in Musoma District and is now very effectively killing clumps of the Prickly Pear; 64 acres are now breeding *Dactylopius* and the insect has been introduced into North Mara District where the problem is probably even more serious than in Musoma. Infested cladodes have also been taken to Ukerewe Island and Mainland. The African population, who seem to be impressed by the effective control being achieved, have themselves started to spread the insects and are asking for further supplies of infested plants. Experiments with various types of weed killers were also carried out and the hormone weed killer "Triozone" gave the best results, but is too expensive for widespread use.

*The freshwater Clupeid *Stolothrissa tanganicae*.

In spite of extremely heavy breeding of grain-eating birds (Sudan Diochs) in the Central Province during the long rains and the known escape of large colonies of birds, which the control team was unable to reach in time, invasion of the long-rains wheat areas of the Northern Province was almost negligible compared with some previous years. The invasion of the short rains wheat crop was the worst for some years and only prompt action prevented considerable losses of wheat.

During early 1958 the birds descended on the West Kilimanjaro crop, but roosts were attacked by air spray using Malathion and losses caused to wheat were comparatively light. With the very good rains in the Central Province there was extensive breeding there. Of seven known breeding sites, covering an estimated 5,000 acres, it was possible to attack four sites only, totalling 1,500 acres. In these sites an estimated 31 million young birds were destroyed, mainly by flame throwers, but also by cutting down trees by local people. A further 16¾ million young were destroyed at two sites in the Northern Province. Throughout these operations there was close collaboration and mutual assistance in the field between Bird Control Officers of Kenya and Tanganyika.

At the end of the year the Northern Province appeared largely free of Diochs. Further ringing of birds was carried out by the Zoologist based on the Central Province, and although many ringed birds have been recovered, and at least two recoveries have been made in Kenya, so far no bird ringed in the Central Province has been recovered in the eastern part of the Northern Province. This remains something of a puzzle, and there is uncertainty about the general origin and line of movement of the birds which attack the wheat areas in the Northern Province. The Zoologist completed his cage experiments with Diochs, in which he was examining factors which might induce the breeding condition; the chief factors would appear to be rain and the availability of green food.

The use of grain protectant dusts by African farmers has increased again during the year and Departmental Officers took part in a distribution scheme for seed protectant dusts designed to test the influence of radio advertisement on the sale of such insecticides and fungicides. All supplies were sold in Sh. 1 packets, but sales fell when the business reverted to the trade. There is no doubt about the demand for insecticides in many areas—almost Shs. 10,000 worth were sold in Bukoba during the year—but commercial firms still find difficulty in organizing distribution.

SECTION VII

Land Planning, Soil and Water Conservation and Land Usage Schemes

There has been further reorganization of the Land Planning and Soil and Water Conservation specialist staff of the Department during the year. The Mechanical and Survey Services were split up and the majority of the Survey Section went to form the new Land Planning Training Centre at Morogoro.

There are now two Land Planning Officers—one for the Northern Region stationed at Tengeru and one for the Central Region stationed at Iringa.

Land Planning Training Centre.—As stated in last year's report, before the Land Planning Officers can carry out their investigations it is necessary for an adequate map to be available. Such maps may be based on air photographs or, more frequently, they are prepared in advance by teams of surveyors from the Land Planning Training Centre in Morogoro.

Survey teams from the Centre carried out surveys of over 200,000 acres of land during 1958. These included 17 surveys in the Eastern Province, 4 in the Southern Highlands Province, 5 in the Central Province, 2 in Tanga Province, and one each in Lake, Northern and Western Provinces. A survey at Biharamulo covered an area of 135,000 acres of Brachystegia/Combretum woodland and tall grassland in a game controlled area, and it was not surprising that the survey teams were often put to flight by rhino, buffalo and lion. Fourteen trainees resigned because they found the conditions of work too arduous. A total of 95 maps, plans and drawings were reproduced by the Centre during 1958.

Northern Region Land Planning Unit.—The Northern Region Land Planning Unit carried out surveys in the Northern, Tanga, Central, Lake and Western Provinces during 1958. In the Northern Province a reconnaissance survey of some 300 square miles was carried out in the triangle Lolkisale-Mukuyuni-Mguuzuberi to determine the suitability of select areas for Waarusha settlement. A preliminary reconnaissance was also carried out in the Mbulu western expansion area, and a detailed reconnaissance made of some 500 acres of land for the proposed Mto-wa-Mbu irrigation scheme. Six thousand acres of the Sanya corridor were divided into 50-acre holdings for the Wameru and a survey was done of the Kisongo Dam site. In Tanga Province detailed reconnaissance soil surveys of 1,000 acres in the Igoma Valley and 300 acres between the Kalimawe Dam and Lake Kihurio were carried out. In the Central Province, a land use survey of 16,000 acres of land below the Ikowa Dam was completed. A soil survey was also undertaken of 15,000 acres of land immediately below the Hombolo Dam, and a reconnaissance soil survey of 200,000 acres of land between the two dams was carried out to select areas considered suitable for irrigation purposes and for a land usage scheme. In the Lake Province detailed reconnaissance surveys were completed over areas of 3,000 acres at Masinde and 3,200 acres at Ninghwa, and a reconnaissance survey of 3,500 acres of land was carried out below the proposed Negezi Dam. An examination of the soils in the valley below the Kazima Dam in the Western Province shows that there is a possibility of putting 350 acres under rice in the mbuga soils.

Central Region Land Planning Unit.—The Central Region Land Planning Unit carried out surveys in the Southern Highlands, Southern and Eastern Provinces of the Territory during 1958. The Huhuni Catchment land use plan was reviewed. It was proposed to continue the provision of dams as funds permitted, but to concentrate on ridging and manuring of the land and the use of good seed. At the Pawaga irrigation scheme a reconnaissance survey, followed by a soil survey, was carried out.

A map of approximately 200 square miles of the Elton Plateau, showing remnant forest patches and badly eroded areas, together with areas under cultivation, was produced. In the Ismani area of Iringa District, surveys of individual holdings only were carried out, but eventually it is intended to survey the whole area, although at present the work is treated with suspicion by the local people. A boundary survey of an area proposed for an African tea scheme at Tukuyu was also completed, and in the Southern Province a preliminary survey was provided on the Nantumbo Experimental Farm in Songea, and field work was completed at the Chiumo investigation area, Newala. In the Eastern Province topographical survey and report of the Visiga-Vikuruti area in Bagamoyo were completed, and surveys carried out in Mahenge and in the Ichonde-Mangula area.

Mechanical Services.—Towards the end of the year, the direction of the Mechanical Services in the Northern Province was taken over by the Agricultural Officer (Farms and Estates) as with the development of his farm planning work, the close co-ordination of mechanical conservation works with farm planning was essential. In view of the considerable enthusiasm with which the services of the Agricultural Officer (Farms and Estates) have been accepted by the farming community, a second Agricultural Officer has been posted to assist him.

Largely due to the rather poor financial returns from the 1957 harvest, farmers in the Northern Province have called upon the Mechanical Services rather less in 1958 than in the past. However, over 1,100 acres of broad base terracing was done. Four dams were constructed, and sixty-nine miles of new roads were built. Other work included digging of silage pits, ploughing, harrowing, planting, spraying, digging of diversion ditches and waterways, and clearing of firebreaks. The demand on the Southern Highlands Province Mechanical Services has increased steadily and the work of the Unit has been much appreciated by farmers of all races.

Land Utilization Schemes.—In the Central Province, although communal turnouts were not as good as usual, some conservation work was carried out during 1958. This work consisted of contour banking, the construction of dams and hafirs, bush clearing and the diversion of a river.

Progress in the Uluguru Land Usage Scheme has now come to a complete standstill. Indiscriminate burning of bush and grass appears to have been more severe in 1958 than ever before.

1958 is the first full year since the abolition of the Usambara Scheme rules and, as was to be expected, there has been a marked deterioration of land use practices throughout the area. Grass burning has caused heavy damage, and even standing crops of wattle, coffee and bananas have been burnt. The protection of water courses is still satisfactory, but husbandry of wattle has deteriorated and many young plantations have not been thinned properly. Tie ridges on slopes of under 25 degrees have practically ceased to exist, and there are signs of gully erosion in many of the lands which were formerly ridged. Bananas are still on the increase, and progress is being made in the establishment of banana shade for coffee. Wattle planting was continued and sugar cane is being well maintained, but the most favoured plant for steep slopes is now *Grevillea robusta*. Live contour hedges seem to be the form of contouring which still finds favour. Contour terraces continue to be the general rule for vegetable planting under irrigation.

The land use scheme in the North and South Pares, which has from the start operated on a voluntary basis, has made steady and satisfactory progress, and the area has been extended. In the Usangi Chiefdom of North Pare almost all the arable land is under ridges and terraces, whereas in the South Pares live contour hedges are gaining in popularity and shallow terraces are gradually forming against them. In Mamba, dry stone terrace faces have been built with very good results. Coffee and wattle planting have proceeded satisfactorily.

In the Geita District of the Lake Province 15 square miles at Shigulwe have been mapped and demarcated for settlement. The area allows for the settlement of 200 homesteads averaging 50 acres each. Planned settlement was also carried out during the year in the Bukole Chiefdom, and approximately 600 holdings were allocated. There is a growing demand for enclosure in North Mara and in north Musoma, but progressive farmers who wish to enclose their land usually meet with strong local opposition. Very creditable attempts have been made at land planning and soil conservation work on individual holdings in Ishingisha, Kwimba District. The Sukumaland Federal Council repealed all Natural Resources rules at their November meeting and it remains to be seen to what extent measures such as tie-ridging will continue to be done by individual cultivators, or how long cultivation and livestock will stay out of areas which were previously closed to them under the rules. In Ukara Island 4,749 yards of storm drains and staggered contour banks were dug. The badly eroded area of Bukwaya Chiefdom in Musoma District, where contour banks were constructed, has recovered well, and land previously closed to grazing is now being re-opened. Field Officers of the Department continued to assist Local Authorities in the making of small dams, and eight of these were built during the year in Musoma District.

SECTION VIII

Irrigation

Progress on various irrigation schemes has been disappointing during 1958 and lack of knowledge and experience of irrigation agronomy, high capital costs, soil salinity and lack of hydrological data remain limiting factors.

In the Central Province the Mang'oinyi Irrigation Scheme has been taken over by the Native Authority and water is now being supplied to 24 African farmers in a pilot area. They have begun work with crops of onion and garlic which should mature in February, 1959, when the price should be at its peak. They intend to follow with maize inter-planted with beans or grams, and are also growing vegetables, European potatoes and bananas.

At Ikowa, cotton appears to be promising and yielded 2,000 lb. per acre on the red loam area, although the quality was lowered by insect damage. Sesame suffered from severe fungal and pest attack, and yielded only 300–400 lb. per acre. The castor was wiped out by insects, but zinnia seed seemed to be worth further trial. On the "mbuga" (cracking clay) soil a yield of 3,500 lb. per acre of paddy was achieved, but on the grey calcareous soil very few of the crops gave profitable yields.

Growing conditions in the dry season in the Central Province with the intense sun and almost continuous desiccating wind, are difficult for most crops. No further land has been opened up for tenants at Ikowa.

In the Northern Province, irrigation plays an important part in maintaining agricultural productivity. In parts of the lower areas of both Moshi and Arusha people rely on irrigation for the production of their main and dry season crops. Overhead irrigation is being increasingly employed on farms and estates, particularly in the coffee belt, and in the area below the Rift Wall for coffee, papain, chillies and other crops.

There has been little progress at the Uru Chini irrigation scheme in Moshi, despite the false optimism engendered by the signing of leases by 16 tenants earlier in the year.

In Tanga Province, Kalimawe Dam at Kihurio in Pare District was completed early in the year, and it immediately became apparent that the consequent alteration in the water regime in the Mkomazi Valley brought a number of problems with it.

Valuable information on cropping under irrigation has been obtained from the Rujewa Trial Farm of the Tanganyika Agricultural Corporation in the Southern Province. Yields of over 4,000 lb. per acre of cotton have been recorded. Construction work at Kalenga will be begun in 1959. The second phase of the Mbozi water conservation scheme was completed, and a third phase started.

The development of the right bank of the Mlali Irrigation Scheme in the Eastern Province is now complete, and there is a waiting list of approximately 100 people for plots on the scheme. Crops of paddy this year have been good, and samples taken from 5 plots have averaged 2,800 lb., which is approximately double that obtained last year. The main problem still remaining, apart from the supplying of sufficient water to all the plots, is that of a suitable off-season crop. Kenaf (*Hibiscus*) has been tried, but was not very successful, and probably the most profitable crops are onions and vegetables, but in so far as the latter is concerned the problem is marketing.

The Beta Trial Farm in Rufiji District has been taken over from the Tanganyika Agricultural Corporation by the Agricultural Department, and some excellent crops, particularly of cotton and Kenaf (*Hibiscus*) have been grown there under irrigation.

In Kilosa District the furrow formerly used by the Kilangali Farm has been repaired and is now being used by many local cultivators. There appears to be an interest in the opening up of a larger area there for irrigation, and preliminary investigations have already been made. Excellent crops of onions and vegetables are being grown under irrigation at Malolo and Kidete Station in Kilosa.

In the Southern Province work began at the end of the year on the Chiumo flood protection scheme in Newala District. The Department has been supervising an experimental area on the low flat ground beside the Ruvuma River, where there is a large area suitable for rice if the early flooding can be controlled.

Investigations have commenced on the possibility of an irrigation scheme in Masasi on the Mkoo River for irrigating another part of the Ruvuma Valley.

The only irrigation scheme of any size in the Lake Province, that below the Malya dam, was enlarged by 25 acres over last year's 110 acres and demand for plots again exceeded the number which was available. Rice yields this year at Malya were in the region of 2 tons per acre. A pilot scheme of 10 acres similar to that at Malya has been put in below the Sola dam in Maswa District. The construction of weirs across two sand rivers have been organised—one in Maswa and one in Shinyanga, both of which divert flood waters into furrows ¾ mile long to augment flood water in separate catchment areas. One of these, the diversion furrow dug at Nyika in the Shinyanga District, was a great success in that it diverted the last flash flood of the season on to 600 acres of paddy, which would otherwise not have carried its crop to maturity.

In the Unyamwezi districts of Western Province there has been continued progress in the building of small dams and the development of irrigated land below them. In 1958, 40 dams have been built in Nzega alone by the local people, utilising money from a Native Authority revolving fund. Increasing use is being made of the irrigable land below the big

dams at Igigwa, Kakola Uyui, Idudumo and Igurubi and committees of farmers are now controlling the allocation of land and water with advice from the Agricultural Department field staff. These committees are proving receptive to new ideas to improve their crops and are beginning to adopt better varieties of seed, early planting in flooded nurseries and transplanting in rows to facilitate weeding by cultivators. Paddy is the main crop in these irrigated areas and very profitable crops have been harvested in some places. The use of stored water for irrigation of crops such as vegetables, onions, castor and simsim in the dry season has not been a success. In some places the water was insufficient but where water is plentiful the causes of failure are not fully understood.

SECTION IX

Animal Husbandry

In last year's annual report it was stated that the functions of all herds maintained on Departmental research stations and farms had been reviewed in conjunction with the Veterinary Department and an overall plan to fit in with the territorial breeding and livestock investigation policy had been evolved. In 1958 the implementation of this overall plan was commenced.

One of the chief factors which is hindering any permanent system of farming in the Southern Province is the lack of stock and general lack of knowledge of livestock husbandry. For this reason a Field Officer (Agriculture) has been stationed at Masasi for the sole purpose of teaching better housing and feeding of stock, the utilization of manure and the use of oxen for ploughing, cultivation and transport.

In the Northern Province a woman Field Officer began to work among the Chagga women. She has concerned herself mainly with improvement in the nutrition of livestock and has brought about a very marked interest in the planting of fodder grasses. Her work is also arousing interest in the better housing of stock, and her advice is being sought on this aspect as well on the question of better quality of stock and the control of disease. In all aspects of this work, close contact is maintained with the Veterinary Department.

In the Lake Province at the Coffee Experimental Station at Maruku, Bukoba, Departmental staff are collaborating with the Veterinary Department in an attempt to introduce improved strains of livestock and poultry into the West Lake Division. It is also proposed to carry out a trial of adding various minerals to the animals' diet. At the Morogoro Farm in the Eastern Province, the live weight gains of progeny of the Hereford Boran bull and the more beefy types of cow on the farm were recorded. Excellent progress was made by all calves, and weight increases averaging 30 lb. per month were the general rule. The plan for the integration of cattle and coffee on Mbozi Farm in the Southern Highlands Province has been partially implemented, and there is now a herd of 21 Indo-African cattle on the station.

The Agricultural and Veterinary Departments arranged for the setting up of four chick-rearing units at the Nachingwea (Southern Province), Mbozi (Southern Highlands Province), Mwanhala (Western Province) and Maruku (Lake Province) farms. The brooder-houses at Nachingwea and Mwanhala were completed before the end of the year, and work was proceeding at the other farms. The first chicks are expected to be reared in 1959.

SECTION X

Mechanization

The Agricultural Machinery Testing Unit was set up in 1957 at Malya in order to test small machinery and tools for use by the peasant farmers and modify and improve them as necessary. During 1958 complete tests have been carried out on nine items of machinery.

A great deal of work and time was also devoted to the development of a hand-driven castor seed decorticator and a castor winnower.

The experience gained by the Unit during the past year has indicated that tests can be divided into two types; one is a "Wear test" lasting 50 hours and the other a "performance test". Oxen and hand power have proved to be unsuitable for wear tests, due to the lack of continuity during the working period and the variable nature of the power available.

The policy of the Department in most parts of the territory is to encourage the use of oxen, but, where tractors are used, active assistance is being provided for African tractor owners. An example of this is in Rufiji District where, early in August, a mobile workshop staffed by a Field Officer with one assistant visited all tractor ploughing societies requiring its services. The workshop is mounted on a Ferguson trailer and drawn by a Ferguson 35 tractor. In Rufiji, there were at one time 17 tractors operating, but by the end of the year for various reasons these had been reduced to 10. The profits made by the Societies were low owing to lack of organization and mechanical and financial knowledge.

Mechanical cultivation by Africans in Tanga Province is largely confined to the rice growing areas at the foot of the Pares and Usambaras. Progress has been good, and a larger area than ever before was ploughed by African contractors, who did a satisfactory job in most cases. In Pare there are now 10 tractor owners who between them own 11 tractors, and it is estimated that 3,000 acres were ploughed by them during the year.

In many parts of the territory, increasing numbers of cultivators are keen to have their land ploughed by tractor, and this has led to several of the wealthier people purchasing tractors to plough on contract for their neighbours.

Mainly due to the activities of the Malya Mechanization Scheme over the last few years, there are now over 60 African tractor owners operating in the cotton areas within 40 miles of Malya. A Machinery Advisory and Maintenance service was therefore set up with the aim of repairing and keeping these tractors in working order, and this unit has operated satisfactorily throughout the year.

In the East Lake Division of Lake Province it is reported that there are now some 55 tractors, mainly owned by contractors in the Musoma District.

The number of African owned tractors in the Southern Province is now ten, and there are also several non-African contractors as well as the Local Councils of Tunduru and Masasi, who own tractors for hire. Over 1,800 acres have been ploughed in Newala District during the year.

Most cultivators who desire to increase their acreage under cultivation almost automatically think of tractors, but the Department hopes to interest an increasing number of people in the use of ox and donkey drawn equipment, this being the next logical step from the use of the hoe. In Sukumaland ox cultivation is on the increase and there is a growing demand for ridging ploughs while the use of ox-carts is increasing more slowly. A survey revealed that there are now 10,500 ox ploughs in North Mara and 4,500 in Musoma District.

There has been decided progress in the use of ox ploughs in all the districts of Western Province except Buha. The Natural Resources Centres are being used as ox-training establishments. Training of oxen is also under way in all districts of the Central Province where Increased Productivity Funds have been utilised for the purchase of ox-equipment.

An important new development at Mahiwa in the Southern Province has been the change-over from tractor to ox draught for all operations, including haulage. One of the main functions of the farm is to train oxen for the plough and cart. For this purpose steers are purchased by Local Authorities, sent to Mahiwa and then returned when they have been trained. Fifteen have been trained during 1958.

The number of ox ploughs in the Southern Highlands Province has increased considerably during 1958, but here as elsewhere little interest has been shown in other ox-drawn implements.

In the Arusha District of the Northern Province ox-ploughing is widespread although the number of tractors available for contract ploughing is increasing. Oxen are used fairly extensively in the central and southern parts of Mbulu, but much of this district is too steep for the use of carts and efforts are now being concentrated on encouraging the use of donkeys with panniers, as large numbers of these beasts exist in the district.

Grinding machines have become popular in many parts of the Territory, and in Unyamwezi there are now more than 50 engine driven mills. There has also been a substantial increase in mechanical grinding in Lake Province.

There is a growing interest in the "Ashkat" paddy thresher and in groundnut shellers. An increasing number of Africans have applied for loans to purchase maize mills and sales of coffee pulpers, particularly in Rungwe District, have been heavy.

SECTION XI

Agricultural Education

As the policy is for Departmental field staff to be teachers and guides to better farming rather than policemen, the Native Authorities are being urged to take over the enforcement of their own agricultural rules and orders. In order that the Agricultural Departmental field staff may improve their technique in explaining new ideas about agricultural development to farmers, intensive efforts have been made to give them additional training. Many unsuitable men have had their appointments terminated and have been replaced by men of higher educational standard and more receptive to new ideas.

In previous years, newly appointed expatriate officers on arrival in the territory have often had to proceed straight to their duty stations and waste a good deal of time struggling with a host of new problems including the local language, office routine and local agriculture. In 1958, however, nearly all recruits were sent on Swahili background courses of six weeks duration provided by the Social Development Department, and these courses were supported by lectures on agricultural administration, the policies of the Natural Resources Department and extension methods. Courses were in most cases either preceded or followed by instructional visits to experimental stations, district extension offices and to Headquarters in Dar es Salaam.

At the Tengeru Natural Resources School, which is now the main training centre for Departmental Field Assistants, the educational standard of the 1958 intake was raised from VIII to X and the length of the course reduced from 3 to 2 years. The new intake totalled only twenty-five students and as a result it was decided that Agricultural Officers should visit Secondary Schools to recruit more students for the 1959 course.

At the Ukiriguru Agricultural Training Centre one course for teachers and two courses for instructors were completed during 1958. One of the instructors courses was of one year's duration and was attended by 42 subordinate service instructors of low educational standard of whom 41 obtained certificates. The other course which commenced in 1956 consisted of 41 students, all of whom were successful in the examinations.

Three new courses began towards the end of the year. The first of these was a two-year course for instructor students of Standard VIII and over, the second was a one-year course for students of less than Standard VIII education and the third was the usual one-year teacher course. The Lake Province Ginners' Association presented a sum of £25,000 in 1955 for the provision of a school for students' wives at Ukiriguru. The school was opened during 1958 and 16 wives attended the first course.

At Mahiwa, the Training Centre of the Southern Province, a 9 months' course was run for 23 teachers from Government, Mission and Local Authority Middle and Primary Schools.

Six separate courses were held at the Land Planning Training Centre in Morogoro attended by 17 Field Officers and 10 Field Assistants. Eight African students who had completed courses in surveying and mapping at the Centre were examined by the Department of Lands and Surveys and obtained satisfactory passes in 1958. Of the 144 new students who were recruited, only 40 are at present still with the Land Planning Centre, as large numbers found the field work too arduous and others failed in examinations.

The Wami Farm School, which aimed at providing practical training for boys who would have the opportunity of taking up mechanised mixed farming on their own account after they had gained experience, was closed down due to lack of support.

Good progress has been made in many parts of the territory in establishing the new Primary and Middle School agricultural syllabuses. A very successful course for primary school teachers was organised by the Department in Mbulu District. Another notable achievement during the year was the production by two officers of the Department of a detailed textbook about agriculture in Primary Schools in Tanga Province. Competitions between school farms were again held in many areas.

In view of its situation, the Ujiji Middle School in Western Province is now concentrating on the teaching of fishing methods and the preparation and maintenance of fishing equipment rather than on agriculture.

Short courses arranged locally for instructors were given in several districts of the territory during the year, and are now considered as normal routine in certain areas.

SECTION XII

Agricultural Extension

Good progress has been made in many areas of the territory where resentment caused by agricultural rules and regulations is either being forgotten or has never arisen. The land use scheme in the north and south Pares has made steady and satisfactory progress. It has in fact become popular. Concentration of effort in focal point areas has achieved good results for example in the Bagamoyo and Handeni Districts where substantial increases in production have been achieved and in North Mara where coffee quality has been exceptionally high. In an attempt to obtain the goodwill and trust of the farmers, the field staff has undertaken certain executive services in the Bukoba Karagwe area. These services, which are financed by the Buhaya Council, included the sale and distribution of pruning saws, secateurs, seed, fertilisers and insecticides as well as the provision of a number of coffee pruning and spraying teams. Full charges were paid by cultivators and yet the demand for the services often exceeded the supply and the farmers accepted advice with the services.

The provision of services to growers is a particularly popular part of the activities of the Department and is taking place in many other districts. Examples of these are the nurseries of coffee, pyrethrum, citrus, limes and spices which are being maintained in several areas.

In Lushoto District, a start has been made using visual aids to assist extension work. A limited area was chosen where vegetables are grown on terraces under irrigation. A strictly limited number of lessons were put across and farmers were shown how to dig terraces and how to make and apply compost to them. The Visual Aids Officer of the Social Development Department assisted the campaign, and the actual aids used were a cinema van, posters, transparencies, leaflets, flannelgraphs, flash cards and displays. Also integrated into the scheme were radio programmes and competitions in local newspapers. The campaign lasted only three months, and therefore did not achieve very much on the ground, but some very valuable lessons were learnt in assessing the value of the different techniques. The cinema van usually drew a large crowd, and was obviously valuable as a spearhead to the campaign.

Many other examples of local initiative in extension work are worthy of mention. A Field Assistant in Kahama District made a series of notice boards on which were written the "tasks for the day"; in Nzega, farmers were shown how to make simple threshing tables for rice so as to avoid beating the plants in a heap on the ground. Demonstration tobacco barns have been built in Kibondo, and Songea. Ten thousand leaflets extolling the virtues of early cotton planting were distributed. Competitions were held in Rungwe between coffee farmers and in Morogoro between cotton farmers. Articles on coffee were written by the Agricultural Officers in Moshi and Arusha and published in the vernacular press.

A demonstration plot was established at Mfumbwe to compare seven possibly suitable methods of soil and water conservation on a slope varying from 20—30 degrees. A tobacco film borrowed from the Nyasaland Government has been widely shown in Songea. A demonstration lime grove has been planted in the Southern Province. There are many other examples too numerous to mention.

A half-hour radio programme entitled "Maarifa ya Ukulima" ("About Farming") produced every second week during 1958, surprised even its producer by the extent of its popularity. In a newspaper poll it was voted the second most popular programme (after a gramophone record request programme) in the Swahili language. The magazine "Ukulima wa Kisasa" ("Modern Farming") was produced each month during the year and circulated largely in the Lake Province. There has again been a steady stream of press releases from Headquarters published in both the English and Swahili press.

The Department has taken part in agricultural shows all over the country. The Agricultural Show at Kakonko in Kibondo District this year was organised entirely by the Local Authorities of the two chiefdoms comprising the district. One of the Chiefs had recently visited England where he attended the Melksham Show, and so at Kakonko there was a grand parade of animal prize winners before the show closed. At the Bukoba Show the Department had six different stands scattered round the show ground illustrating different aspects of its work.

Officers of the Department have been encouraging various Farmers Clubs in different parts of the territory. In Bukoba, the Buhaya Agricultural Association has been established for many years but farmers clubs in Sukumaland and in Newala and management committees for the Natural Resources Centres in Nzega are relatively new developments. Much can be achieved by extension officers working with such progressive farmers.

The Agricultural Officer, Farms and Estates, in the Northern Province was largely instrumental in initiating two very useful Farmers' Days during the year. The first covered a silage making demonstration at Ol Joro, while the second was a highly successful day at Mr. Von Senger's coffee estate. It is considered that functions of this sort, especially when visiting specialists can be present, are a most valuable means of extension work among estate owners.

In the Eastern Province, as the result of a recommendation by a Working Party, a Field Officer (Farms and Estates) has been stationed at Wami to help Asian farmers since August, 1958. With his training in mechanised agriculture and in stock husbandry, this officer should be of considerable benefit to those farmers who are in a position to initiate improvements on their farms.

SECTION XIII

Fisheries

For the first time in several years the Fisheries Division was up to its full complement of four Fisheries Officers. Due to normal leave movements, it was possible to maintain fisheries services this year only at their previous level rather than to expand the activities of the Division.

The Marine Fisheries base at Pangani, Tanga Province, was manned by a Fisheries Officer throughout the year, and a Fisheries Officer was stationed at Malya, Lake Province, for work on dam fisheries in the Lake Province and the Unyamwezi Districts of the Western Province.

In addition to his administrative and advisory duties, the Fisheries Officer stationed at Headquarters toured all Provinces in the Territory during the year to assess the prospects for fisheries development and to advise the agricultural field staff on ways and means of carrying this out.

Fisheries policy continues to be the development of the existing indigenous coastal and inland fisheries and the development of new fish resources by the stocking of dams and natural ponds. There has, however, been a growing realisation of the extent to which, in many areas, fishing and agriculture are closely interlinked in the peasant community. In

consequence, there has been a move towards the closer integration of fisheries and agricultural extension work. This is being fostered, both on the coast and inland, by the organisation of in-training in fisheries extension methods for the agricultural field staff in fishing districts.

Marine Fisheries

The focal point for the development of the coastal inshore fisheries is the Tanga Province coast and the base at Pangani has become a centre which enjoys the increasing confidence of the fishermen over a wide area. Based on Pangani are several trials and demonstrations of a wide range of new or improved types of fishing gear and the organisation of courses of instruction for private fishermen as well as for departmental staff.

The great interest now shown by African fishermen in all kinds of new gear, particularly nets and cordage of synthetic fibres, is in large measure due to initial success with the introduction of the large blue nylon shark net of 6 in. mesh. Over fifty of these nets were sold in the Tanga area during the year and the possession of one has now become a matter of prestige amongst good fishermen. Such a net, fully rigged with its lines, floats, etc., costs about Shs. 2,000 to put into the water and it is a measure of its success that, whilst many fishermen have availed themselves of a Government Loan for the purchase of this gear, others have bought it outright for cash.

Unlike their colleagues on inland waters, the coastal fishermen as yet show little interest in organised Co-operative Societies but they are well aware of the advantages of co-operation on a less formal basis. This year the Pangani prawn fishermen formed a group for the pooling of their catches for shipment to and sale in Tanga.

The great interest shown in improved types of fishing gear is not as yet extended to the advantages to be derived from mechanised fishing craft. It is obvious that the smallest and cheapest type of imported fishing boat such as the Department's "Mtembezi", a 22-foot wooden vessel, powered by semi-diesel, which could be purchased for around £1,000, is still considered as quite beyond the reach or comprehension of the African fishermen, even though substantial loan assistance could be obtained for purchase. This parallels the situation in Zanzibar where a loan scheme based on this type of vessel did not meet with success.

Accordingly the problem of mechanisation is being considered from an entirely different angle viz: by the mechanisation of traditional native craft. The Territory was visited by a Naval Architect of the Fisheries Division of F.A.O. who, after inspecting various native craft, advised that the 30 ft. sailing "mashua" of the pattern built at Jibondo Island in the Mafia Group would be most suitable for simple mechanisation. A vessel of this type is now being built for the Department by African craftsmen at Jibondo, using traditional methods. On completion a small inboard marine petrol engine will be fitted. The engine will mainly be considered as an auxiliary to cope with contrary winds and tides. It is hoped that demonstrations with this vessel, which could be made available to fishermen for £350 to £400, will stimulate the long awaited move to mechanisation.

On the Southern Province coast, because of poor or uncertain communications both to the hinterland and to the more populous areas of the northern coastline, the fishing population is sparser and the pace of development inevitably slower. Nevertheless Southern Province fishermen are proving receptive to new ideas, several nylon shark nets are now in use and loan applications for further nets are coming forward.

The necessity for fish from the remoter areas to be very adequately smoked or dried to stand up to prolonged periods of storage or transport is frequently complicated by the fact that the best fishing season is in the rains when normal curing methods in the open are difficult if not impossible. The close association of coconut growing and fishing on the coast has opened up the possibilities that the simple type of home kiln which has been developed for copra production can also be used for fish smoking. Experiments on these lines are now being developed in Kilwa.

Inland Fisheries

In spite of the adverse rains, which affected the fisheries on smaller lakes and dams in some areas, in general the inland fisheries have enjoyed a prosperous year. With few exceptions, the marketing of fish is not canalized to the same extent as that of agricultural produce and the assessment of production is consequently a difficult problem. There is however, little doubt that the inland fisheries continue to expand their output both for territorial consumption and for export to neighbouring territories.

One factor which has led to increased production on all main lakes and many minor waters has been the almost universal change over from nets of flax and cotton to those of nylon and other synthetic fibres with their greater durability and greater catching power. For some years after the war, manufactured nets of all kinds were in short supply and, the import trade in nets being centred on Lake Victoria, much of Tanganyika's quota was re-exported to Kenya and Uganda in spite of needs elsewhere in the Territory. In the past year or so the situation has radically altered and there are now considerable stocks of cheap and efficient Japanese nylon nets available in a wide range of twine thicknesses and mesh sizes. The sellers market on Lake Victoria had for so long dominated the trade that net importers had little conception of the needs and demands elsewhere in the Territory. One of the main tasks of the Fisheries Division has been the organisation of supplies of fishing gear where needed by putting retailers in touch with importers and by persuading retailers to stock fishing nets in new fishing areas, such as those of the Central Province. By giving very wide publicity about the prices and availability of nets in the Territory to fishermen in the remoter areas it has been possible to break up the practice of certain retailers who have been selling nets at anything up to 20 per cent above the normal Dar es Salaam or Mwanza retail prices.

The inland fisheries situation during the year, by Provinces was as follows:

Central.—Of outstanding interest is the opening up of Lake Kitangiri, Iramba District, as a *Tilapia* fishery. Previously this shallow lake in the Eyasi Depression had supported only a small subsistence fishery for catfish and lungfish. The discovery this year that considerable stocks of *Tilapia* were present, with subsequent instruction to the lakeshore inhabitants in the use of gill nets for catching them, has led to the establishment of a most valuable fishery which, at the end of the year, was producing around 16 tons of fish a month. The natural outlet from Kitangiri being across the Wembere and Sibiti plains, much of this fish is being exported to the Lake and Western Provinces.

An intensive programme of stocking of all dams and small lakes has been virtually completed in Central Province and the next phase, the organisation and development of fishing, is well under way. The Singida group of waters comprising the Mianje Dams and Lakes Kindai and Singida is now producing about 9 tons per month. In Dodoma District, the newly-opened Hombolo Dam supports a population of 70 fishermen whose catch is 12 tons per month.

Taking into account the seasonal fishery for catfish at Lake Surungai (Bahi Swamps) the total annual production of fish from the Central Province is not less than 600 tons, fresh weight.

Eastern Province.—Although this province supports many small lake and dam fisheries, the main interest lies in its river fisheries, in particular those of the Rufiji, Ruvu and Wami systems. Of especial importance is the fishery on the Kilombero River, tributary of the Rufiji, with its marketing headquarters at Ifakara, Ulanga District. This fishery has been known to export up to 150 tons of smoked fish (equivalent to 450 tons fresh weight) per annum to Morogoro and Kilosa.

Lake Province.—Responsibility for the investigation and development of the fisheries of Lake Victoria rests with the East Africa High Commission and details of progress on this most valuable of the Territory's inland fisheries are to be found in the Annual Reports of the East Africa Fisheries Research Organisation and the Lake Victoria Fisheries Service.

In view of periodic complaints regarding a shortage of fish in the vicinity of Lake Victoria it is worthy of note that an investigation on fish marketing conducted for the Uganda Government this year, has revealed that there are very considerable exports of smoked fish from Tanganyika waters to Uganda.

From its fish ponds at Malya the Department has assisted in the programme for stocking Lake Victoria with the herbivorus *Tilapia zillii.*

In the Sukumaland districts of the Province a programme of dam stocking and fishing has been carried out. The lateness of the rains led to the drying out of many smaller dams this year and rendered fishing exceedingly difficult in many others.

Northern Province.—The centre of inland fisheries interest in this Province is Mbulu District. Small scale fisheries are conducted on Lakes Manyara and Basotu, but there is a fishery of prime importance at Lake Babati where some sixty fishermen are engaged in producing about 15 tons of *Tilapia* per month. Developments at Babati this year have included the preliminary formation of a fishermen's Co-operative Society, and work in hand includes the stocking of additional species of *Tilapia* and the introduction of new types of fishing net.

Southern Province.—All suitable small lakes and dams in the Southern Province have now been stocked with *Tilapia* from the Mahiwa ponds and several flourishing small fisheries such as those of Lake Rutamba, Lindi District and Lake Kitere, Mtwara District have developed in consequence. Stocks of fish continue to be maintained on the Departmental farm at Mahiwa for stocking new dams and the re-stocking of any waters which may require it.

The building of family fish-ponds or "stew-ponds" continues apace in Songea District and the movement is now spreading to the adjoining Tunduru District. At the end of the year there were some 900 ponds in existence in Songea District.

Southern Highlands Province.—The fishery of main importance is Lake Rukwa. The fishermen's Co-operative Society which was established there this year has evidently run into many teething troubles in connection with marketing. There is no record of the large quantity of dried fish which continues to be exported away from the lake by native itinerant traders but production through the Society amounted to 400,000 smoked *Tilapia* valued at £3,000.

There are considerable but unknown quantities of fish produced from the rivers and lakeshore of Lake Nyasa in Rungwe District and, to a lesser extent in Njombe District.

Tanga Province.—The inland fisheries of this Province are concerned with the series of small lakes and dams associated with the Pangani River System. Some of these such as Lakes Manka and Kihurio and the Kalimawe Dam support a considerable fishing population who have been advised and assisted this year. These fisheries are particularly susceptible to the vagaries of water level, a situation which has been complicated this year by the needs of irrigation and the control of flood water associated with the Kalimawe Dam project.

Western Province.—The "dagaa"* fisheries of Lake Tanganyika enjoyed another prosperous year. Some 1,500 tons of dried "dagaa" passed through official markets but there is an ever-increasing tendency for sales (which are subject to a Native Authority cess) to by-pass normal marketing channels. The export of dried "dagaa" to Belgian ports by individual African fishermen continues and the fact that about a hundred outboard engines were purchased by Lake Tanganyika fishermen during the year is a reflection of the volume and value of this unrecorded trade.

The Malagarasi Swamps of Tabora District support a large fishery mainly for *Tilapia.* 650 tons of smoked fish were railed from the area in 1958.

A new fishery of considerable value for the supply of fresh fish to Tabora has developed on the Igombe Dam and the Department has been active in advising fishermen on fishing methods and in organising supplies of suitable fishing gear.

*The freshwater Clupeid *Stolothrissa tanganicae.*

SECTION XIV

Legislation

The most important legislation affecting agriculture which was promulgated during the year was as follows:—

(a) *Rules.*—The Coffee Industry Rules published on 21st February, 1958, gave details of the various new types of coffee licences and methods of application for them.

The Pyrethrum Industry (Collection of Levy) Rules of 29th August, 1958, specified that the levy on the pyrethrin content of pyrethrum should be collected by the agency appointed by the Pyrethrum Board.

(b) *Orders.*—The Coffee Industry (Levy on Coffee) Order of 31st January, 1958, specified a levy of Shs. 10 per ton (clean coffee) but this was changed to Shs. 20 per ton in the No. 2 Order published on 30th May, 1958.

The Plant Protection (Compulsory Fumigation of Imports) Amendment Order made slight changes in the schedule of materials which had to be compulsorily fumigated.

The Ginnery Areas (Lake Province) (Amendment) Order of 21st March, 1958, (and also the No. 2 Order of 11th April, 1958) made changes in the areas of Mugango, Nassa, Nyambiti and Luguru cotton zones consequent on the setting up of the new Ushashi Ginnery. The new Manonga zone was also gazetted.

SECTION XV

Boards and Committees

The following appointments were held by members of headquarters staff:—

Director

Chairman:

Lint and Seed Marketing Board.
Cotton Board.
Seeds Board.

Member:

Board of the Tanganyika Agricultural Corporation.
Tea Board.
Pyrethrum Board.
Tanganyika Coffee Board.
Maize Advisory Committee.
Central Advisory Committee on Nutrition.
Governing Body, Tea Research Institute of East Africa.
Agricultural Research Co-ordinating Committee (E.A.H.C.).
Animal Industry Co-ordinating Committee (E.A.H.C.).
Technical Co-ordinating Committee (E.A.H.C.) Marine Fisheries.
Roads Advisory Committee.
Rufiji Basin Survey Advisory Committee.
Dar es Salaam Chamber of Commerce.

Deputy Director

Member:

International Red Locust Organisation.
Milling Board.
Mkata Ranch Management Committee.

Assistant Director:

Council for the Blind.
Temeke Dairy Management Committee.

Fisheries Officer (Headquarters):

Member:

Lake Victoria Fisheries Board.
Technical Co-ordinating Committee Inland Fisheries (E.A.H.C.).

SECTION XVI

Staff

Mr. J. R. P. Soper, Director of Agriculture, retired in July 1958, and was succeeded by Mr. A. P. S. Forbes, who had been Deputy Director. Mr. L. J. S. Littlejohn, Assistant Director (Extension) was promoted Deputy Director in July but left the territory on 14th December when he was promoted to the post of Director of Agriculture, Cyprus. Mr. M. Lunan, Assistant Director was appointed Acting Deputy Director from the date of Mr. Littlejohn's departure. Mr. D. H. Drennan, Agricultural Officer was promoted to the post of Assistant Director and Mr. D. G. Jones was appointed Senior Research Officer, Grade "A". Mr. E. T. Ward, Senior Agricultural Officer, retired after 31 years of service in Tanganyika and St. Lucia. Mr. J. S. Ishengoma, Assistant Agricultural Officer and Mr. J. M. Ainley, Field Officer were promoted to the post of Agricultural Officer (Tanganyika). Four Field Officers, Messrs. F. P. H. Le Riche, A. M. Pienaar, P. G. Lewis, and W. E. Yeo, were promoted to Senior Field Officer, Mr. I. H. Dillingham was promoted to the post of Tobacco Officer and Mr. M. H. Tirant, Agricultural Foreman, was promoted to Field Officer.

Five new Agricultural Officers joined the Department during the year, one Agricultural Officer left on resignation and one left on transfer to Uganda. One Fisheries Officer arrived on first appointment and two Pasture Research Officers joined the Department on transfer from the Veterinary Department. One Field Officer resigned and nine did not renew their contracts; however 23 new Field Officers were appointed. Two Tobacco Officers left the Department, six new Assistant Agricultural Officers were appointed. One Chemist joined the Department on first appointment, and an Instructress for teaching students' wives at the Agricultural Training Centre arrived in the middle of the year. The post of Experimental Officer was introduced on the 1st July 1958 and the Scientific Officer appointed in 1957 was appointed Experimental Officer and a second arrived during the year. A Land Utilisation Officer was appointed and the Mechanical Instructor had his designation changed to Field Officer.

The post of Junior Accounts Officer was introduced into the establishment on the 1st July. Mr. P. G. Gore, Office Assistant, retired after 29 years service in Tanganyika.

The staff position as at 31st December, 1958, is shown in the following table:—

Staff position as at 31st December, 1958 (not including those on leave pending retirement, resignation, completion of contract and transfer)

Post	Establishment	Strength	Vacancies
Director	1	1	–
Deputy Director	1	–	1
Chief Research Officer	1	1	–
Assistant Directors	4	3	1
Senior Research Officers (Grade A)	3	1	2
Senior Research Officers (Grade B)	3	2	1
Senior Agricultural Officer	1	–	1
Senior Botanist	1	–	1
Agricultural Officers	60	62*	–
Fisheries Officers	4	4	–
Pasture Research Officers	2	2	–
Entomologists	4	4	–
Plant Pathologists	4	3†	1
Botanists	3	3	–
Plant Physiologist	1	1	–
Horticulturist	1	1	–
Chemists	5	3‡	2
Zoologist	1	1	–
Master seconded from Education Department	1	1	–
Master	1	1	–

*Two held against Senior Agricultural Officer and Assistant Director of Agriculture vacancies. Includes 12 allocated to Department, not yet arrived.

†Includes one allocated to Department, not yet arrived.

‡Includes one allocated to Department, not yet arrived.

Staff position as at 31st December, 1958 (not including those on leave pending retirement, resignation completion of contract and transfer) (continued)

Post	Establishment	Strength	Vacancies
Instructress	1	1	–
Secretary	1	1	–
Treasury Accountant seconded from Accountant-General's Department	1	1	–
Experimental Officers	4	2	2
Land Utilization Officer	1	1	–
Senior Field Officers	13	12	1
Tobacco Officers	3	1	2
Coffee Grader	1	1	–
Inspector	1	–	1
Field Officers (Agriculture)	117	102	15
Assistant Agricultural Officers	14	12	2
Assistant Surveyors	3	–	3
Agricultural Foremen	6	6	–
Assistant Inspector	1	–	1
Research Assistant	1	1	–
Assistant Field Officer (Agriculture)	1	–	1
Office Superintendent	1	1	–
Junior Accounts Officer	1	1	–
Office Assistants	5	3	2
Accounts Assistants	4	3	1
Warden	1	1	–
Stenographers/Personal Secretaries	7	7	–
Clerks Upper Division	30	28	2
Clerks (General Division/Subordinate Service "A")	119	109	10
Senior Field Assistants	14	10	4
Field Assistants	631	541	90
Agricultural Instructors (Subordinate Service "C")	1,316	1,246	70
Chemical Assistants	2	2	–
Coffee Grading Assistants	1	1	–
Medical Assistants	1	–	1
Artisans	5	3	2
Laboratory Assistants	7	2	5
Junior Laboratory Assistants	2	2	–
Laboratory Auxiliaries	10	1	9
Motor and Tractor Drivers	2	2	–
Telephone Operator	1	1	–
Subordinate Service Staff (various)	189	161	28
Fisheries Assistants	8	4	4
Fisheries Guards/Senior Fisheries Guards	18	6	12
Coffee Grading Auxiliaries	8	6	2
Junior Survey Assistants	60	48§	12
Pasture Assistants	5	5	–

§**Works Staff** employees held against graded posts.

SECTION XVII

Research

Progress in establishing the four Regional Research Centres has been good. The Northern Regional Research Centre was opened by His Excellency the Governor in September. The Southern and Central Regional Research Centres were completed. A beginning was made on the laboratories for the Western Regional Research Centre. During the year responsibility for pasture research was transferred to this Department from the Department of Veterinary Services.

Apart from special crop investigations the main line of research being followed is that of maintaining and improving crop production by means of manures, fertilisers, fallows, intercropping and crop succession with emphasis on those crops best suited to local conditions. Useful results are being obtained from formal experiments and in a few areas it is now possible to begin to give thought to the next stage, that of building up these results into a number of simple farming systems for trial. This stage is particularly difficult since the systems must clearly be an advance on local practices and yet not be so different as to preclude the possibility of acceptance. The process of translating experimental results

into practice must be one of "grafting" them onto the local system rather than one of sudden change. In some cases the new systems will have to be suitable for hoe cultivation; in others they will have to be adapted for ox-cultivation. At this stage factors that were excluded from the formal experimental work have to be considered, i.e. work input on cultivation, harvesting and movement of manure; crop planting sequence; organisation of cultural operations, this particularly so in the case where ox-cultivation is concerned; balance of different crops to prevent unbalance of work input and, of special importance, the cash outlay that may be necessary to raise the level of the system above that of subsistence. One particularly difficult aspect in areas without cattle will be the land-resting period. It is known from the results of experimentation that in some areas no benefit will be obtained by abandoning the land to a weed fallow for several years. Positive measures must be taken to improve fertility, but it will be difficult to persuade a peasant farmer to put work into an operation that will not yield any return for several years. In cattle areas it should be possible to devise improved farming methods that will rest the land under grass and so provide an incentive. Such work as this is of vital importance in relation to the problems of land enclosure.

Central Research Region.—Work on improving cotton yield and characteristics is continuing by means of plant breeding and pest control for both rain-grown and irrigated cotton. From three strain comparison experiments 48 strains have been kept for further study. These show generally improved resistance to jassid attack, higher ginning out-turn and, of course, good yield. There is an increased tendency to neppiness as greater lint length, strength and fineness are developed. This tendency must be carefully watched. It was found that by planting cotton in double rows with a wider spacing between the paired rows there was no loss in yield. With this planting method spraying operations could be performed more easily.

The castor breeding and agronomic programme is proceeding. Further work has confirmed that intercropping maize and groundnuts gives higher cash returns than pure stands and that the arrangement of the plants on the ground can be varied within limits.

Coast Experiment Station, Chambezi.—A study of five years records of numerous individual coconut palms has shown that individual palms appear to have a cycle of production. This cyclic production may be of short duration, maxima every second year, to long duration, maxima every fifth year. Further work on this finding is very necessary as it may have an important bearing on experimental work on coconuts.

Mbozi Coffee Station.—The problems of the growing coffee on this station are becoming more clearly defined and a new programme of research is being developed.

Northern Research Region.—Since the farm at the Regional Research Centre is most atypical of the area served, the agronomic programme is largely carried out on private farms and district plots. Long-term experiments cannot be carried out until a number of sub-stations are established. Short-term experiments on cotton varieties and pest control, intercropping of cotton and maize, maize cultivation and time of planting were started. The wheat and maize breeding programmes were continued. It is hoped that high-yielding, short season, rust resistant wheat varieties will be produced. Of the 640 varieties tested this year 540 were discarded as unsuitable. The aim of the maize programme is to produce short season varieties of about 70 days for hot areas with an average rainfall of about 25 inches.

A useful strain of the African foxtail grass *Cenchrus ciliaris* was introduced. At Oljoro two strains of *Panicum coloratum* have stood up well to flooding in the rains and extensive severe cracking of the heavy black clay soil in the dry season.

Southern Research Region.—The general agronomic programme includes work on fertilisers and manure for several crops, the value of bush fallowing and a study of three contrasted methods of maintaining productivity involving three different farming systems. This latter is being done largely to discover the difficulties that will arise in this type of work particularly on the maintenance of adequate records.

Good progress is being made in the soya and sesame breeding programmes. A plantation of cashew trees from the principal producing countries of the world has been established.

Pests of cashew have continued to receive attention especially the two species of *Helopeltis*. It is becoming clear that *Pseudotheraptus wayi* which spots and blackens the young nuts is of considerable importance and that the Red Banded Thrips, *Selenothrips rubrocinetus*, can be responsible for serious losses. The life cycle of Cashew Bark Borer, *Mecocorynus loripes*, has been worked out in detail. The control studies on Helopeltis suffered as in none of the areas chosen for insecticide treatment did any appreciable build up of the pest occur.

A sub-station has been opened at Mtopwa on the Makonde plateau to study local problems.

Western Research Region.—A feature of the season has been the comparatively high level of control yields of seed cotton, about 650 lb. per acre, from land that has been cropped at a high standard of management. Responses have been high, 300–800 lb. of seed cotton per acre to manure and phosphate applied in previous years but with sulphate of ammonia applied in the current year in the case of residual phosphate. It has been found that the improvement in yield of cotton brought about by the UK breeding programme has been partly due to achieving a higher resistance to bacterial blight than was anticipated.

With the appointment of an entomologist to the Research Centre work on cotton pests has increased. It has been found that the importance of spiny bollworm may have been under-estimated in the past. A wide range of trials testing the value of cash crops other than cotton was carried out in Lake Province.

Maruku Coffee Station.—Good progress has been made in finding a solution to the problem of establishing robusta and arabica coffee, on the poor Rweya soil type. Progress is also being made in the Improvement of Soil Fertility programme.

Urambo Experiment Station.—Progress on the research programme at this station is slow as the Officer in charge has to do a great deal of advisory work on tobacco during the early part of the planting season.

Mwanhala Experiment Station.—Good progress continued in spite of a difficult rainy season.

SECTION XVIII

Conclusion

In conclusion I wish to thank all members of the department for the hard work which they have carried out under increasingly difficult conditions during 1958. I also wish to thank those who have again helped us in the various boards and committees associated with the work of the Department.

A. P. S. Forbes,
Director of Agriculture

MONTHLY RAINFALL IN INCHES FOR SEASON 1957/58 AND YEAR 1958 AT PROVINCIAL STATIONS

	Morogoro		Dodoma		Tabora		Mwanza		Mbeya		Arusha		Tanga		Mtwara	
	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.	Ins.	Average Ins.
October, 1957 ...	0·95	0·93	0·00	0·17	0·90	0·40	1·71	1·73	0·00	0·67	1·12	0·30	2·44	4·21	0·44	1·13
November, 1957 ...	2·52	2·05	0·09	0·80	0·71	3·79	4·66	3·61	0·24	2·18	5·86	1·72	6·96	4·15	0·64	1·05
December, 1957 ...	2·02	2·80	4·55	3·92	7·80	6·73	8·18	6·26	5·82	5·43	9·28	2·83	3·81	3·13	17·38	6·90
January, 1958 ...	0·84	3·79	6·26	5·78	4·60	5·13	1·90	3·26	6·04	8·12	1·52	3·47	0·27	1·29	1·48	10·40
February, 1958 ...	4·42	4·04	11·78	4·15	6·53	4·84	5·39	2·92	6·28	6·61	5·98	3·22	0·36	1·78	6·02	5·34
March, 1958... ...	9·02	6·61	5·52	4·89	4·95	7·05	5·15	5·50	7·66	7·06	4·86	1·66	5·67	4·58	5·12	5·89
April, 1958	6·74	8·18	0·21	2·19	3·83	4·79	3·04	6·18	2·12	3·80	14·09	14·29	8·33	9·13	4·18	7·72
May, 1958	1·15	3·99	0·02	0·22	0·77	1·09	2·30	3·41	0·00	0·71	5·63	8·11	11·39	9·13	0·29	1·85
June, 1958	1·67	1·03	0·00	0·00	0·00	0·10	0·95	0·43	0·00	0·05	1·65	1·28	6·39	2·90	0·02	0·49
July, 1958	0·00	0·53	0·00	0·00	0·00	0·00	2·22	0·89	0·00	0·02	0·25	0·56	1·43	2·22	0·02	0·83
August, 1958 ...	0·65	0·36	0·00	0·00	0·00	0·04	1·04	0·91	0·00	0·03	0·05	0·75	1·59	2·89	0·00	0·41
September, 1958 ...	0·35	0·68	0·00	0·06	0·00	0·29	0·93	1·55	0·00	0·10	0·04	0·60	1·25	3·33	1·41	2·18
Total for Season ...	30·33	34·99	28·43	22·18	30·09	34·25	37·47	36·65	28·16	34·78	50·33	38·79	49·89	48·74	37·00	44·19
October, 1958 ...	0·03	0·93	0·00	0·18	0·79	0·57	4·35	1·73	0·00	0·49	0·00	1·10	2·24	4·16	0·26	0·71
November, 1958 ...	1·37	2·06	0·13	1·05	2·61	3·72	1·40	3·61	0·23	2·10	0·52	3·41	1·76	4·26	2·97	0·97
December, 1958 ...	3·84	2·78	6·53	3·52	4·73	6·80	8·60	6·26	6·85	5·45	2·74	4·38	4·46	3·18	8·80	9·13
Total for 1958 ...	30·08	34·98	30·45	22·04	28·81	34·42	37·27	36·65	29·18	34·54	37·33	42·83	45·14	48·85	30·57	45·92

CROP PRODUCTION FIGURES

MAJOR CROPS

SISAL

Year	Production in tons
1954	178,250
1955	176,499
1956	185,762
1957	184,877
1958	196,567

COFFEE

Mild Coffees

Tons of clean coffee

Province	1954/55	1955/56	1956/57	1957/58
Northern	6,959	10,091	9,350	8,475
Southern Highlands	1,061	694	1,467	2,467
Southern	390	490	500	626
Tanga	336	304	300	515
	8,746	11,579	11,617	12,083

Hard Coffees

Tons of clean coffee

Province	1954/55	1955/56	1956/57	1957/58
Lake	8,627	9,144	10,200	9,404
Eastern	51	331	400	255
Tanga	30	29	50	48
Western	–	–	–	35
	8,708	9,504	10,650	9,742

COTTON

Production in Bales of 400 lb.

Province	1954	1955	1956	1957	1958
Lake	90,859	108,843	121,304	151,322	151,608*
Eastern	8,966	8,439	8,730	12,500	14,421
Tanga	364	1,814	2,275	2,245	2,518
Northern	2,191	2,834	1,244	2,212	1,947
Western	–	–	–	732	897
Southern	258	128	38	50	42
	102,638	122,058	133,591	169,061	171,433

*Of this approximately 2,000 bales were destroyed by fire

CASHEW NUTS

Tons of nuts sold through local markets.

Province	1954	1955	1956	1957	1958
Southern	11,500	13,233	14,363	20,500	18,679
Eastern	1,658	1,799	2,284	2,900	1,877
	13,158	15,032	16,647	23,400	20,556

CASSAVA

Tons sold through local markets

Province	1954	1955	1956	1957	1958
Southern	4,297	8,786	21,387	19,600	20,925
Western	4,243	5,935	9,648	4,600	5,888
Lake	37	10	100	1,100	1,624
Eastern	487	245	337	100	168
Tanga	–	–	–	–	56
Central	20	18	–	–	18
	9,084	14,994	31,472	25,400	28,679

Coconuts

Tons of Copra

Province	1954	1955	1956	1957	1958
Eastern	7,299	4,955	4,204	4,000	5,423
Tanga	4,794	5,486	4,607	3,500	4,533
Southern	495	552	852	800	999
	12,588	10,993	9,663	8,300	10,955

Maize

Tons

Province	1954	1955	1956	1957	1958
Northern	17,173	36,041	26,000	20,000	26,500
Southern Highlands	13,399	25,766	7,250	5,200	15,282
Western	10,032	17,864	7,615	7,800	8,048
Eastern	6,271	20,069	6,560	7,300	6,000
Lake	4,429	5,740	3,687	4,300	5,178
Southern	4,550	2,670	3,990	5,500	3,007
Tanga	1,050	9,118	2,248	1,000	2,305
Central	562	3,322	2,650	600	1,394
	57,466	120,590	60,000	51,700	67,714

OIL SEEDS

(a) Castor Seed

Tons sold through local markets

Province	1954	1955	1956	1957	1958
Central					3,030
Northern					1,700
Southern					1,114
Eastern	9,609	7,870	12,012	13,894	747
Southern H'lands					322
Lake					48
Western					12
	9,609	7,870	12,012	13,894	6,973

(b) Cotton Seed

Tons surplus

Province	1956	1957	1958
Lake	36,000	41,500	47,871
Eastern	2,800	3,900	4,593
Northern	500	500	1,450
Tanga	300	400	1,092
	39,600	46,300	55,006

(c) Groundnuts

Tons sold through local markets

Province	1954	1955	1956	1957	1958
Western	1,131	3,122	6,035	5,500	3,597
Central	654	550	2,096	2,700	3,268
Southern	1,480	3,985	4,158	3,200	1,575
Lake	843	827	2,081	2,500	937
Northern	–	–	211	500	200
Southern Highlands	–	79	79	200	129
Eastern	–	–	–	700	–
	4,108	8,563	14,660	15,300	9,706

(d) SESAME

Tons sold through local markets

Province	1954	1955	1956	1957	1958
Southern	2,490	4,138	6,176	5,900	6,236
Eastern	184	299	558	400	556
Southern Highlands	–	–	–	–	151
Lake	33	36	65	100	63
Western	–	–	45	50	41
Central	–	43	50	50	1
	2,707	4,516	6,894	6,500	7,048

(e) SUNFLOWER

Tons of seed sold through local markets

Province	1954	1955	1956	1957	1958
Eastern	658	603	1,326	2,600	2,717
Western	1,512	5,311	3,482	4,000	2,516
Southern Highlands	355	289	701	1,000	1,099
Southern	508	539	738	2,500	1,024
Lake	677	2,423	886	1,000	737
Central	155	104	356	400	347
Northern	594	968	451	1,100	320
Tanga	93	109	17	50	87
	4,552	10,346	7,957	12,650	8,847

RICE

Tons of paddy

Province	1954	1955	1956	1957	1958
Lake	4,620	3,712	2,781	6,000	8,647
S. Highlands	6,890	6,042	2,709	5,100	8,450
Eastern	9,841	14,172	2,319	8,300	5,864 (a)
Western	1,640	2,962	2,230	4,000	3,025 (c)
Tanga	2,321	2,783	2,436	3,000	2,467
Southern	1,215	2,276	1,835	1,400	1,271 (b)
Northern	74	84	51	50	160
Central	–	48	–	–	25
	26,601	32,079	14,361	27,850	29,909

NOTE:— (a) Includes 724 tons rice. (b) Includes 314 tons rice. (c) Includes 6 tons rice.

PULSES

(Including yellow peas, chickpeas, soya, mixed beans, cowpeas, grams, pigeon peas, bambarra nuts).

Province	1954	1955	1956	1957	1958
Northern	4,022	*1,398	4,147	1,600	3,640
Lake	6,890	4,472	2,299	3,500	3,099
Southern Highlands	1,210	1,064	2,208	1,600	2,077
Southern	2,237	2,700	2,794	4,000	1,672
Western	1,754	2,680	1,892	1,800	1,039
Tanga	–	618	276	800	624
Eastern	688	565	592	800	603
Central	31	73	106	100	49
	16,832	13,570	14,314	14,200	12,803

*Excluding haricot beans 1,358.

PYRETHRUM

Tons of dried flowers

Province	1954	1955	1956	1957	1958
Northern	360	379	479	446	376
Southern Highlands	175	234	261	291	249
	535	613	740	737	625

SEED BEANS

Tons exported

Province	1953/54	1954/55	1955/56	1956/57	1957/58
Northern	1,894	2,110	2,549	1,247	3,420

TEA

Manufactured tea in lb.

Province	1954	1955	1956	1957	1958
S. Highlands	3,583,655	3,303,666	3,520,893	3,993,407	4,122,245
Tanga		1,217,449	1,832,139	2,132,177	2,205,929
	3,583,655	4,521,115	5,353,032	6,125,584	6,328,174

TOBACCO

(a) *Flue-cured*

Cured leaf in lb.

Province	1954	1955	1956	1957	1958
S. Highlands	3,269,407	2,909,890	2,738,283	2,735,000	2,748,480
Western	228,863	291,165	572,925	773,000	927,360
Southern	73,920	185,920	112,000	134,000	17,920
Lake	–	–	–	2,000	–
	3,572,190	3,386,975	3,423,208	3,644,000	3,693,760

(b) *Fire-cured*

Cured leaf in lb.

Province	1954	1955	1956	1957	1958
Southern (Songea)	1,516,489	982,240	647,535	598,000	1,272,320
Western	–	–	–	–	389,760
Lake (Nyamirembe)	400,960	361,312	545,720	473,000*	85,120
Tanga	–	–	–	–	44,800
	1,917,449	1,343,552	1,193,255	1,071,000	1,792,000

*Includes Western Province.

WATTLE

Tons sold through organized markets

Province	1956 Production (Tons)	1957 Production (Tons)	1958 Production (Tons)
Tanga	2,250	1,050	1,417 { 1,152 wet, 265 dry
Northern	300	300	167
Southern Highlands	370	150	14
Eastern	–	50	–
	2,920	1,550	1,598

WHEAT

Tons sold through organized markets

Province	1954	1955	1956	1957	1958
Northern	9,320	3,722	4,237	3,300	5,996
Southern	350	303	368	300	347
Southern Highlands	100	80	97	200	130
Western	–	28	68	50	59
Eastern	–	51	–	50	29
	9,770	4,184	4,770	3,900	6,561

MINOR CROPS

ONIONS, in tons

Province	1954	1955	1956	1957	1958
Northern	1,603	2,297	3,911	2,580	1,820
Central	317	160	272	300	268
Southern Highlands	–	195	201	210	211
Southern	–	16	22	10	22
Tanga	–	–	53	40	14
Lake	250	8	25	10	10
Western	–	17	21	20	6
Eastern	70	61	150	140	–
	2,240	2,754	4,655	3,310	2,351

GUMS

(Arabic and Copal) in tons

Province	1954	1955	1956	1957	1958
Western	397	426	285	150	235
Lake	256	402	158	150	129
Central	193	157	175	100	111
Southern	–	–	–	50	2
	846	985	618	450	477

KAPOK

(in tons)

Province	1954	1955	1956	1957	1958
Eastern	424	216	941	1,200	732
Tanga	110	337	415	400	311
Southern	45	62	44	50	13
	579	615	1,400	1,650	1,056

OIL PALM

(a) Palm oil in tons

Province	1954	1955	1956	1957	1958
Western	110	83	47	50	39
Tanga	35	40	40	30	–
	145	123	87	80	39

(b) Kernels in tons

Province	1954	1955	1956	1957	1958
Western	488	370	351	350	378
Tanga	24	30	30	20	–
	512	400	381	370	378

EXPORTS FROM TANGANYIKA OF AGRICULTURAL PRODUCTS, 1954-1958 (TONS)

	Maximum Export prior to 1958		1954 Amount	1955 Amount	1956 Amount	1957 Amount	1958 Amount	Export value, 1958
	Year	Tons	Tons	Tons	Tons	Tons	Tons	£
Sisal	1956	185,588	167,642	173,676	185,588	181,815	198,130	10,348,965
Cotton Lint	1957	28,311	12,111	20,374	27,890	28,311	30,229	6,861,983
Cotton Seed	1957	8,386	—	—	—	8,386	7,520	139,261
Cotton Seed Oil	1957	1,981	—	—	—	—	1,148	117,160
Coffee	1956	21,625	19,382	18,499	21,615	18,481	22,225	7,578,725
Beans and Pulses	1952	23,184	10,432	8,279	9,413	5,368	9,521	561,320
Beans, Soya	1957	1,483	522	567	913	1,483	696	31,472
Cashew Nuts	1957	33,651	16,298	18,202	16,741	33,651	31,310	1,086,509
Castor Seed	1957	13,894	9,609	7,870	12,012	13,894	17,858	812,187
Cassava	1956	24,000	1,714	2,486	24,000	20,051	15,912	238,680
Copra	1928	9,318	2,046	4,723	3,788	236	2,339	135,223
Groundnuts	1936	22,786	2,503	5,586	15,143	16,090	12,624	779,469
Gum Arabic	1950	2,319	1,534	2,125	1,542	684	503	43,864
Gum Copal	1950	110	58	70	45	40	13	1,029
Kapok	1957	905	581	872	717	905	862	106,650
Maize	1956	106,363	—	35,835	106,363	9,071	1,224	24,264
Millets and Sorghum	1955	13,150	17	13,150	5,084	899	2,563	50,248
Onions	1948	2,418	872	151	90	171	40	1,486
Palm Kernels	1954	674	674	386	472	454	66	28,528
Papain	1948	130	103	37	17	23	68	190,002
Pyrethrum	1945	697	136	275	307	292	625	175,000
Rice	1938	17,965	72	1,247	1,794	1,853	919*	38,506
Sesame	1956	10,628	3,108	4,207	10,628	8,180	8,496	591,705
Sunflower Seed	1957	19,626	10,202	12,506	14,729	19,626	11,557	277,492
Tea	1957	2,176	1,566	1,689	1,979	2,176	2,339	631,506
Tobacco	1948	1,421	350	448	135	342	217	43,801
Vegetable Oils	1940	2,268	723	61	1,468	57	28	3,580
Wattle bark	1955	4,837	2,122	4,837	3,178	1,525	13	18,804
Other Oil Seed and Oil Nuts	—	—	—	—	—	—	1,029	19,148
Essential Oils	1950	9	2	3	4	4	39	7,004
Total	—	—	264,379	338,161	465,655	374,068	380,176	30,943,571

*Includes 526 tons of paddy.